

Contractors and Engineers Monthly

Vol. 44, No. 5

MAY, 1947

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Covering the Field

• Laying Drainage Pipe

Using wellpoints to dry up the site and jacking a section under tracks featured a concrete-pipe-laying job. See this page.

• Asphalt Road-Mix

An experimental job reported on this page used native sand stabilized with asphalt for a low-cost road.

• Concrete Paving

Operations on an 11-mile contract for a reinforced 8-inch concrete slab are detailed colorfully on page 1.

• Channel Dredging

Typical daily yardage for a veteran hydraulic dredge was 52,000 cubic yards, according to the article on page 2.

• Shield-Driven Tunnel

Compressed air and a shield were used to drive one end of a new under-river vehicular tunnel, as told on page 6.

• Highway Grading

Grades and curves were reduced on a 4.8-mile heavy relocation job (page 12). Treatment to prevent frostboils marked a 3.6-mile job reported on page 39. Scrapers averaged 2,150 yards daily on a highway reconstruction. See page 63.

• Roadside Grasses Studied

A state test plot described on page 15 will help determine proper grass species, mulch, and season for seeding.

• Winter Paving at Airport

Rock aggregate for a bituminous penetration runway was pre-heated with an asphalt-plant drier. See page 21.

• County Road Work

The 1946 advance in secondary-road construction is summarized on page 24—and found to be good.

• Testing Laboratory

A card system indexes results of laboratory tests one state makes on all materials used for its roads (page 25).

• Soil Conservation Work

Organized in districts, lowland farmers of our country have embarked on a master drainage program outlined on page 31.

• Bridge Construction

Page 49 tells how a two-span bridge involved in a road relocation was built on piles driven to ledge rock.

• Road-Base Construction

It took water control, skill, and experience to road-mix 22 miles of crushed-caliche base. See page 53.

• Telling the Public

The bureau of public relations recently set up by a state department is described as to policy and methods on page 60.

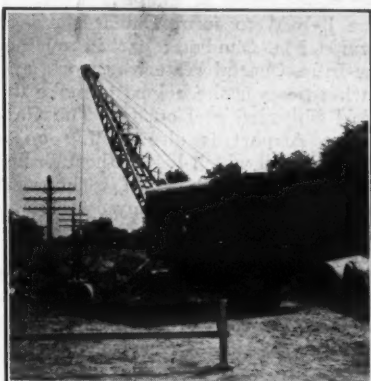
• Highway Maintenance

How a state added over 1,000 miles of paved surfacing to its system in one season is told on page 71.

• Cofferdam for Dam Job

Called-in timber-crib cofferdam described on page 88 diverted water from the site of a new concrete dam.

Will find "In This Issue" on page 4)



C. & E. M. Photo
Staying clear of overhead wires, a Northwest crane lowers 48-inch reinforced-concrete pipe into an open trench. The line will serve as a storm-water sewer from the railroad underpass at Warren Point, N. J.

Asphalt Road-Mixed To Stabilize Sand

Important Experimental Contract Uses Native Blow-Sand in Base and Top for Low-Cost Road

† SOUTH of Yuma, where silent sand dunes stretch for monotonous miles towards Mexico, an unusual road-building experiment has been in progress. A road base has been built with desert sand. Its wearing surface—for a time at least—is built with the same fine drifting sand, and stabilized with RC-2 cut-back asphalt.

If the experiment is successful, the L. M. White Contracting Co. of Tucson will have proved that low-cost secondary highways, built with native material once considered extremely unsuitable (Continued on page 17)

New Concrete Pavement Laid on Beeline Highway

Contractor Pours Nearly 11 Miles of Reinforced 8-Inch Concrete Slab on U.S. Highway 275

† A CONCRETE paving job of interest in the midwest last season was a new 10.7-mile stretch of relocation and paving on U. S. 275, about 20 miles west of Omaha, Nebr. Dobson & Robinson Construction Co. of Lincoln had the \$448,000 contract with the Nebraska Bureau of Highways.

The contract called for new location, for all but short distances at each end, to be built a considerable distance south of the existing highway. The new road runs parallel to the Union Pacific railroad tracks between Omaha and the west.

When paving started near the city of Fremont, western terminus of the proj-

Concrete Pipe Laid To Drain Underpass

† BUILDING a new grade-separation structure to carry the Erie railroad over State Route 4 at Warren Point in Bergen County, N. J., involved laying a reinforced-concrete pipe line. Its purpose was to augment the existing drainage facilities, which proved inadequate at the original bridge site. Work on the new grade-separation span started in August, 1946, after the New Jersey State Highway Department awarded a \$256,302.21 contract to the Ell-Dorer Contracting Co. of Irvington, N. J.

Of this amount, \$161,894.25 was allocated to the bridge. The remaining \$94,407.96 was for the road and drainage features of the project. Of the latter, the principal item was laying 2,038 feet of 48-inch storm-water sewer from the underpass to a creek emptying into the Passaic River. On the way to its outlet the pipe was laid in an open trench, except for a 44-foot section that was jacked under the double-track railroad. The soil was so wet that a well-point system was necessary in order to lay the final 700 feet of pipe near the outlet.

This line of the Erie railroad was built near the end of the last century. The original grade-crossing elimination carried the tracks over the highway on a 60-foot steel-girder span supported on masonry abutments. In 1927 State Route 4 was reconstructed and widened as one of the main approaches to the George Washington Bridge, which was opened in 1931 to traffic crossing the Hudson River to New York City. The highway was built with dual 9-inch reinforced-concrete pavements, 20 feet wide, on a 110-foot right-of-way except where it passed beneath the railroad. The dual pavements were separated by a 21-foot center mall, and flanked on

Wellpoint System Needed Near Outlet of Trench; 44 Feet of 48-Inch Line Jacked Under Railroad

the outside by 10½-foot shoulders.

At the bridge site, the 60-foot horizontal clearance still allowed a 40-foot traveled way; however, it eliminated the dividing strip and shoulders in favor of pedestrian walks. This created a bottleneck which the new structure with two 50-foot spans will eliminate. The new roadway will have three 12-foot lanes in each direction, separated by a 12-foot dividing mall where the middle pier of the bridge is located. The vertical clearance is also increased from 12½ to 14 feet by building the new structure higher than the old, while still keeping the highway at its original grade.

Storm water was drained from the underpass through catch basins located at the edges of the road near both the east and west sides of the old structure. These emptied into a 42-inch reinforced-concrete pipe which left the west side of the underpass and continued southward down East 55th Street, under from 2 to 8 feet of cover, until it emptied into the outlet creek. During heavy rainstorms, this drainage system failed to carry away the water quickly enough; often 4 to 5 feet of water backed up under the bridge and halted all traffic.

Storm-Water Sewer

The Ell-Dorer Contracting Co. sublet the road and drainage work of the project to the Union Building & Construction Co. of Passaic, N. J. This firm began operations by laying the new 48-inch reinforced-concrete pipe designed to augment the existing 42-inch line.

New catch basins now intercept storm water as it flows down a slight grade about 300 feet east of the underpass. They empty into the new 48-inch line; this runs south on East 57th Street parallel to and just east of the railroad, which at this point runs almost due north and south. The pipe line continues on this course for about 650 feet

(Continued on page 74)



C. & E. M. Photo

From 200 to 240 batch trucks rolled up each 10-hour day onto this Blaw-Knox turntable, which Dobson & Robinson kept about 250 feet ahead of the paver.

Vital Ship Channel Deepened by Dredge

**Venerable Burlington
Performing Brilliantly
On 5,500,000-Yard Mud
Job in Gulf Channel**

By **RAYMOND P. DAY**,
Western Editor

★ THE 34-year-old hydraulic dredge Burlington, veteran of many a dredging battle, is still capable of pumping 52,000 cubic yards a day. That is the typical day's yardage she is setting for Standard Dredging Corp. of New York on a 5,526,000-cubic-yard maintenance dredging job in Galveston Channel, Texas. The work is being done for the Galveston Office of the U. S. Engineer Department on Standard's low bid of \$0.0586 per cubic yard.

Such spectacular performance is largely the result of soft material. It is a deep blue mud, ranging from pure sludge to soft clay. Carried in the stream estuaries and currents within the bay, the fine mud is deposited at an average rate of about 18 inches per year. The passage of deep-draft freighters prevents very much mud from forming in the Galveston side of the 1,125-foot-wide channel. But about 13 feet of material has been left on the Pelican Island side in the 2-year period since the harbor was last dredged. The maintenance dredging of Galveston has been a regular part of the Army Engineer program for many years, and more than once Standard Dredging Corp. has been the low bidder on the work.

The present job is 19,880 feet long over the entire 1,125-foot channel. It calls for a project depth of minus 34 feet, referred to mean low tide, plus an additional pay allowance of one foot for overdepth dredging. The work is located generally in front of the city of Galveston, within a few miles of the U. S. Engineer district office.

If all goes as splendidly as at present, contractor's representatives expect to beat the Government time estimate and finish by July 1, 1947. Considering that dredging began on December 22, 1946, that is impressive yardage for so short a time.

The Dredge Burlington

The Burlington is a 27-inch hydraulic pipe-line rig, with oil-burning dual boilers and steam-turbine drives on her 27-inch pump and cutter shaft. She was built in 1913 in Dubuque, and the original wood hull is still in service. This hull, measuring 149.3 x 42.3 x 6.2 feet, is internally braced with a steel framework, making her sturdy and tight.

In her time the Burlington has stuck her snout down in many a mudbank. She helped to form Davis Island at Tampa, Fla. She had a part in much of the Intra-Coastal Waterway work, and during the war she helped to make the Todd Shipyards at Houston. The Galveston Airport is also resting on a hydraulic fill which hissed through her pipe lines. The ghosts of a thousand tough deckhands and many a temperamental but good bull cook haunt her staterooms and galley.

She has a 70-foot ladder weighing about 70 tons with the cutter and shaft in place. Her LD-5 clay cutter will dig 52 feet deep. It has five spiraled blades, so designed that two blades are always digging as the cutter revolves. She has a 30-inch round intake suction pipe, slightly flared at the end and placed in line with the back of the cutter frame. Some experiments were made to move the intake back about 18 inches, but the mud was too heavy to pull and the section was welded back in place.

Her digging spud is 75 feet long and 30 inches in diameter. Weighing about 25 tons, it is made of hollow steel. The walking spud is 69 feet in length, has the same diameter, and weighs 20 tons. Both spuds are set in spud wells inside the dredge hull, and wide spud centers permit the Burlington to make a fair step with a short swing.

She has a double-elbow stern swivel connection, which permits the floating pipe line to be well anchored in rough weather. She is handling 285-foot-wide cuts quite easily on this job in Galveston Channel, without making too many moves of her 6,000-pound swing

anchors as she steps on up the line.

Burlington Well Powered

There have been a number of alterations to the dredge since she was built, and all have been in the interest of an increase to her power. She now has two Foster Wheeler water-tube boilers with 3,050 square feet of heating surface in each. They are equipped with Foster Wheeler economizers, each having 1,350 square feet of heating surface, and with 2 heavy-duty superheaters. Fitted with the Coen system of fuel-oil burning, the boilers are delivering 50,000 pounds of steam per hour at an operating pressure of 250 psi.

Her old surface condensers have been lengthened and re-tubed by Standard Dredging Corp., and are now exceedingly efficient. She uses Coffin single-stage feedwater pumps which deliver feedwater to the boilers at a temperature of 240 degrees and a pressure of 350 psi.

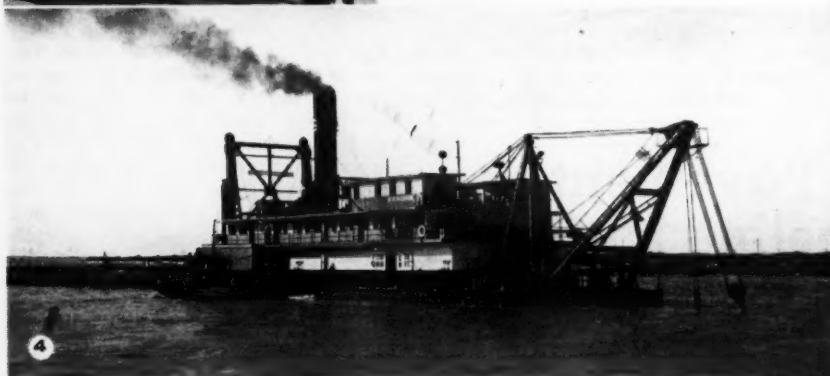
She uses a 2,500-hp turbine, turning 3,900 rpm. The planetary gear set was removed from this turbine, and a De Laval gear-reduction box was installed to bring the pump speed down from 350 rpm to about 280. Her pump efficiency jumped with the change.

Another turbine also drives her cutter shaft, but it has been reduced to 1,200 hp by blanking off some of the nozzles. The pumping turbine is being used "raw"—that is, without a governor. Both have overspeed safety trips that will cut off the steam when the turbines reach 4,600 rpm.

As Chief Engineer S. L. Harrison explained, "Plenty of steam at plenty of pressure means horsepower, and horsepower is the job of the engine room". He might have added that horsepower is one of the secrets of dredging.

The Burlington also uses a Westinghouse 100-kilowatt turbo-generator set for fuel-pump motors, condensate pumps, shop motors, the bilge pump, and the induced-draft fan. A 100-hp Flory reciprocating swing engine is mounted forward, driving a 7-drum hoist. A Rex 3-inch bilge pump is ordinarily used, and there is a 2-inch unit serving as a standby. The Burlington uses an Ingersoll-Rand fuel pump, and a 5,500-gpm Elliott circulating pump on

(Continued on page 77)



C. & E. M. Photos

1. W. W. Vance (left), Director of the Operations Division, U. S. Engineer Office in Galveston, Texas, is helping to direct the current maintenance dredging job in Galveston Channel. With him is E. H. Vaughan, Jr., Resident Engineer. 2. The dredge Burlington, whose A-frame and 70-foot ladder awash at the water line are shown here, is averaging 52,000 cubic yards a day for the Standard Dredging Corp. 3. Capt. E. Y. Eliason is Master of the dredge, and S. L. Harrison her Chief Engineer. 4. The Burlington is a 34-year-old hydraulic dredge, and in her time has stuck her snout down in many a mudbank. 5. The service-tug Peter C and an anchor scow are two of the auxiliary craft which keep the Burlington working at top speed. Here they move ahead a 6,000-pound swing anchor. 6. The Burlington is working with a floating line of 3,500 feet maximum length. 7. Captain Eliason walks out to the end of the discharge line about once a day to inspect operations on Pelican Island.





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Watch Your Weights

Contractors who use trucks—and where is there one who does not?—should take warning that the easy liberties they enjoyed during the war years of loading their fleets of trucks as they pleased are on the way out. In many states the state police are riding herd again on the big truckers. And contractors, those engaged in road building in particular, are not immune from state load laws.

While the war was on, law-enforcement officers overlooked the many violations that commercial users of the highways committed while keeping materials on the move in our war economy. But that era is past. Many states now have the scales out again and are checking rigidly for overloaded trucks. To avoid paying fines, alert contractors are looking up the laws of the states in which they are operating, and loading their trucks accordingly.

Some contractors have been caught in a jam. They have bid jobs, for instance, on the basis of using 5-ton trucks to haul say 10 tons of road-building material. Most trucks are pretty sturdy and will take the overload without complaint. Not so the highways. The majority of our existing

roads have not been rebuilt to take heavy loads. And until they are, many states with load statutes on their books are going to see that they are enforced. Therefore it behooves contractors to investigate the laws of loading, and find out just what they can and cannot do before going overboard on hauling items in their bids.

One way out is the so-called maintenance tag, which some states issue to truckers for a yearly fee. A truck bearing this tag is permitted to load to a certain limited excess of the law. The fee is meant to offset the theoretical damage done to the highway by the overloaded truck, and is supposed to go to the state highway maintenance department. In many cases contractors will find it profitable to avail themselves of these tags, when the states issue them, as the extra load that can be carried may more than pay the price of the tag.

Contractors and their superintendents, who have forgotten the details of these loading statutes during the past several years, should check with the state motor-vehicle bureaus or police. By taking this precaution they may avoid possible arrest and fines.

How to Make Money

Under this title, J. W. Terteling of J. A. Terteling & Sons, Inc., well known contractor of Boise, Idaho, discussed safety at the annual convention of the Associated General Contractors of America. Mr. Terteling is a practical construction man and has learned from experience that accident prevention is not only humanitarian—it is also profitable.

He emphasized the urgent need for contractors to realize that they can make money by an all-out effort to prevent accidents. His personal experiences presented concrete evidence of the fact that "a contractor can be 5 per cent lower on his bid by utilizing the net saving that has come to him as a result of his exceptional safety record over a period of years".

This is plain common sense. And many contractors in the highway and heavy-construction field have recognized it. But in the April issue of *National Safety News*, Robert L. Moore, Senior Engineer, Construction Section, National Safety Council, points out this discouraging fact: only one member in fifty of the Associated General Contractors entered and finished the 1946 accident-prevention contest. True, there was more evidence of interest in safety at the 1947 AGC convention than in any previous one. But we still have not accomplished much to which we can point with pride.

The National Safety Council's records show that the construction industry's position in accident prevention remains

static. It ranks 29th in accident frequency and 36th in accident severity, out of 40 industries. Surely we can do better than that!

The initiation of a sound safety program is not expensive. The Federal Safety Council recommends, for Government workers, an expenditure of from \$3 to \$6 per employee per year, depending upon the hazards of the occupation. Two big industrial firms with excellent safety records spend about \$7 per employee per year on their accident-prevention programs. Lowered insurance rates alone should soon offset this. The investment in time, too, is small, when compared with the time lost on many jobs due to needless accidents and the resulting injuries.

Safety is not a nebulous ideal to which we merely pay lip service. It is common sense and a sound business policy; it can create an immeasurable amount of good will and good public relations; it means efficiency and profits. It is enlightened self-interest. "Safety Always Pays" is more than a slogan; it is a fact.

Memorial Day this year will mark the Silver Anniversary Sale of Buddy Poppies. These poppies are made by disabled war veterans in Government hospitals. The entire proceeds from their sale are devoted to welfare and relief work among needy veterans and their families. Your support will help, so buy and wear a V.F.W. Buddy Poppy on Memorial Day.

Highway-Access Control Is Discussed in Booklet

A concise review of the problems involved in public control of highway access and roadside development has been prepared by David R. Levin. Mr. Levin heads the Special Administrative Studies Unit of the Division of Financial and Administrative Research, Public Roads Administration. In the booklet, now available for distribution, he gives his conclusions and recommendations on this subject and his reasons.

The booklet contains a complete discussion of controlled-access highways, the technique of highway-access control, the need for it, and an appraisal of the device. Also discussed are: marginal-land acquisition, land-use controls, acquisition of highway-development rights, restriction of ribbon development, and many related subjects.

There are five appendices dealing with: (1) a model for a controlled-access highway law; (2) a model for a highway-development-rights law; (3) state controlled-access highway legislation, covering the laws enacted by 24 states; (4) Great Britain's Restriction of Ribbon Development Act, 1935; and (5) the case of Cook vs. the State of Minnesota, 1945.

Copies of the booklet can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 35 cents a copy.

Aerial Photography Speeds Road Locations

Several advantages of aerial photography for road work were cited at the recent Annual Meeting of the American Society of Civil Engineers. Officials said that this method of locating expressways, parkways, and other routes will do the job better and faster, at lower cost, and with less man-power.

According to the engineers present, the cost of reconnaissance surveys has been reduced to about \$0.86 per acre, as compared with early costs of about \$10.00 or \$12.00 per acre. Pictures, they said, are helpful in locating gravel or other construction material, in determining soil types, and in determining present land use. Other features brought out were their easy readability and value as exhibits in condemnation proceedings and damage suits.

Speakers also pointed out that this type of survey helps eliminate friction

In This Issue

Airports	21
Base-Course Stabilization	1, 53
Bituminous Paving	1, 21, 71
Book Reviews	65, 91
Bridge Construction	49
Channel Maintenance	2
Concrete Construction	1, 46, 47, 49
County Road Work	24, 63
Dam Construction	88
Dredging	2
Editorials	4
Equipment Care	34
Erosion Control	46, 47
Grade Separation	1
Grading	12, 39, 63
Highway Maintenance	71
Legal Decisions	44, 45
Pipe Laying	1
Portrait in Print	66
Public Relations	60
Roadside Development	15
Safety	4, 22, 33, 34, 85
Soil Conservation	31
Soils Studies	73
Testing Laboratory	25
Tunnel Construction	6

with land owners whose property may be taken up. Formerly, land owners were apt to become hostile and remain that way throughout the survey. But now, with aerial photographs to aid them, state officials can place all the facts and proposals before the property owners when they are first contacted.

AED Supports Scrap Drive

Added impetus has been given to the scrap-iron drive now under way (see C. & E. M., April, pg. 90) by an urgent request from William A. Danner, President, Associated Equipment Distributors. President Danner declared that the shortage of scrap iron threatens to curtail seriously the production of iron and steel, thereby further slowing deliveries of construction equipment. He urged all local equipment-distributor associations to organize scrap-iron drives.

The shortage of scrap has many causes: the severe drain made upon it to keep wartime production at maximum rates; losses suffered through ship sinkings; equipment that has been left overseas.

At the present time steel mills cannot, without an increased amount of scrap iron, meet the heavy demands for iron and steel to make up deficiencies created during the war. Anything made of iron or steel is valuable as scrap, Mr. Danner reminded AED members: old construction equipment, parts, pipe, worn-out tanks, boilers, etc.

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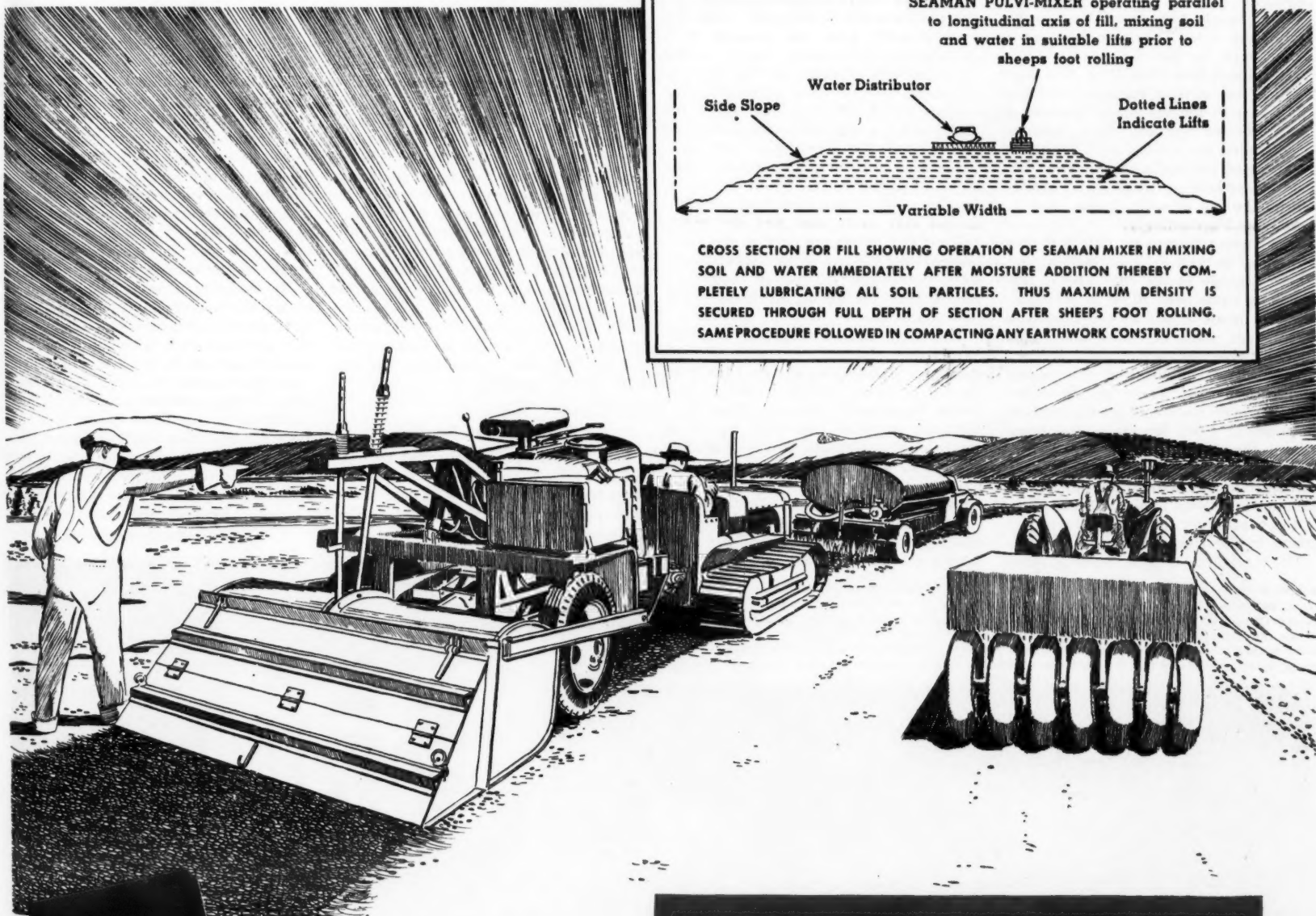
Good proof of this is shown in the construction of the Santa Monica (Calif.) Municipal Airport where all embankments and subgrades under runway and taxiway pavements were required to be highly compacted by a

pneumatic roller ballasted to 100 tons. A scarifier was used to precondition the soil.

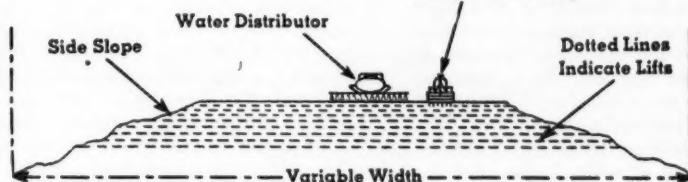
As the work progressed, densities were unsatisfactory, averaging about 92%, despite a great increase in the passes made by the roller.

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Shield Is Used to Drive And Line 31-Foot Tunnels

Compressed Air Required In Boring Twin Vehicular Tubes on One Contract of New York City Project

By WILLIAM H. QUIRK,
Eastern Editor

♦ THE Brooklyn-Battery Tunnel beneath the East River in New York City will connect the Borough of Brooklyn in the vicinity of Hamilton Avenue with Battery Park at the southern tip of Manhattan. Its construction is being advanced by separate contracts from either side of the river. Because of the different types of material encountered below the riverbed, different methods are being employed by the two contractors who are engaged on this great project of the Triborough Bridge and Tunnel Authority.

On the Mason & Hanger Co., Inc., contract (see C. & E. M., April, 1947, pg. 2), three separate operations were used in driving the twin tunnels through nearly 4,000 feet of rock on the Manhattan side. The Brooklyn end is being built by the George H. Flinn Corp., also of New York City. And there a mixed face of rock, hardpan, clay, and silt was met for the major portion of its 3,700-foot section. This material necessitated the use, in each tunnel, of compressed air and a shield. The cast-iron tunnel-liner rings are erected within the tail of each shield.

On the Manhattan side, compressed air has been required for only a 70-foot stretch of bottom drift in each tunnel. There a gorge in the rock above, that had long since been filled in with glacial till, made a rift in the otherwise fairly even slope of schist underlying the silty riverbed. When these sections are enlarged, shields and compressed air will be used. From the Brooklyn end, however, no covering rock is found until about 1,000 feet from the point where the two contracts are joined. The tunnel from Brooklyn will "hole through" to the Manhattan tunnel this summer at a point about 100 feet south of the ventilation shaft near Governors Island in the Upper Bay.

The tunnel has twin 31-foot-diameter

tubes 9,117 feet portal to portal, separated a minimum of 45 feet between their center lines. Work on them actually started back in 1940 but was suspended in 1942 because of the war. Construction was resumed in November, 1945, and by the end of 1946 the Brooklyn shield-driven tunnels had advanced more than 2,500 feet north of the construction shaft. Present estimates call for the completion of the twin tubes some time in 1949, when two lanes of traffic will be carried in each tunnel on a 21-foot 4-inch roadway.

George H. Flinn Corp. Contract

The George H. Flinn Corp. is working north from two construction shafts sunk into Hamilton Avenue near Van Brunt Street. Nearly 1,400 feet had to be driven before reaching the U. S. bulkhead line. But as this was mostly through flat lands along the river indicated by mooring channels, compressed air had to be used almost from the start.

A shield was assembled at the foot of the shaft dug for each tunnel, while the ground-water level was lowered by a dewatering well system. Only 15 feet of cover was available at the start so air could not be used at once. After driving the shields in free air about 400 feet, the first bulkheads with locks were constructed 300 feet from the shaft. From this point on, air pressure was maintained from a minimum of 10 to a maximum of 37 pounds per square inch. Before the river was reached, a clay blanket had to be deposited on the river bottom over the line of the tunnels, as at some points only 20 feet of cover extended from the top of the shield to the bed of the river.

The Great Lakes Dredging Co. hauled bargeloads of clay from New Jersey meadows for dumping along a 1,100-foot stretch of tunnel where it passed beneath Buttermilk Channel. This impervious material was built up to a height of about 20 feet. It was extended out for 15 to 20 feet beyond the outer limits of the two tubes and then sloped down to the river's bed. Despite this additional layer which must be removed when compressed-air operations are completed, the normal 40-foot ship



For this shot the camera was set up in the west tunnel of the Brooklyn contract on the pressure side of the 12-foot concrete bulkhead. Note the track layout through the muck lock, the flying gangway, and the stairs to the personnel air locks.

channel was maintained up the East River. If this material had not been added, the shallow bed of the river might have been blown through by the force of the compressed air.

As work is now progressing through the twin tubes, the sand hogs enter compressed air through locks in the first 12-foot-thick concrete bulkhead. They go into a section of tunnel 800 feet long where 15 pounds of pressure is maintained. At the north end of this section they go through another set of locks into a working air pressure which averages from 30 to 35 pounds per square inch. The highest permissible pressure under which men may work is 50 pounds.

Round-the-clock operations are maintained, with the shifts necessarily staggered so that crews are always kept at work. The number of hours that men may work under air varies with the pressure. When it is below 26 pounds, 6 out of 24 hours are worked in two shifts of 3 hours, with a rest period of 3 hours in between. For 26 to 33 pounds, two 2-hour shifts are worked, with a rest period of 4 hours intervening. For pressures of 33 to 37 pounds, the highest air conditions experienced on this project, the working time is limited to two 1½-hour shifts separated by 4½ hours in free air.

Shield-Driven Tunnel

The air locks project through on both sides of the 12-foot concrete bulkheads. A material lock is placed at floor level; through this pass the muck trains and materials and supplies for use in con-

struction at the heading. Two to three personnel locks are located in the upper half of the tunnel.

The material lock is big enough to contain three muck cars which are pushed in at one end by a locomotive. The door is closed and the pressure equalized with that on the other side of the lock. The opposite door is then opened and the cars taken away by another locomotive. A short section of track close to the door within the lock must be lifted each time by two trammers so that the steel door, fitted with a rubber gasket, can make an air-tight connection.

Of the personnel locks, which are reached by a short flight of stairs, the largest is for the crew. This lock is 6½ feet in diameter; it has two long benches on each side which hold 50 men comfortably, and a lot more if the occasion should arise for a quick exit. The men are passed through this lock by a tender who regulates the pressure by valves within the lock; it is also equipped with gages on the outside.

The working chamber can be entered as fast as the air is admitted to the locks. But when leaving the heading for free air, workers must spend a decompression period within the lock corresponding approximately to 1 minute for every pound of air pressure under which they had been toiling. Thus if sand hogs have been under 35-pound pressure, they have to spend 35 minutes in the air lock on the way out. Failure to observe this rule may result in caisson disease or the "bends". Besides the lock tender, a

(Continued on next page)

Below, a view of the Brooklyn-Battery Tunnel from the east tube of the Flinn Corp. contract, taken in a normal-air section. It shows a flying gangway from the grout platform to the north face of the second lock bulkhead, and the working track layout through and north of the muck lock. At right, an empty muck car is lowered to the bottom of the shaft by a 2-car hoist. It has been unloaded at a gantry platform built above street level, where the muck was dumped into a bin and discharged through a hopper to haul trucks beneath.



Shield Drives, Lines Two 31-Foot Tunnels

(Continued from preceding page)

timekeeper is also stationed at the personnel lock so that a careful check is always kept on the number of men working at the heading.

Besides the large crew lock, the bulkhead also contains another man lock, 5 feet in diameter. It is located in the upper part of the bulkhead and kept ready for an emergency. In some instances, a third lock may be provided for supervisory personnel. These locks may be operated by valves placed both on the inside and outside. The interiors of the locks are well illuminated and the heavy doors are fitted with glass portholes. On the free-air side the doors open inward into the lock, while on the pressure side the doors open outward into the high air.

The shield at the heading weighs nearly 400 tons when fully equipped. It is shoved ahead 32 inches at a stroke by 28 hydraulic jacks pressing against the cast-iron liner rings already in place. Excavation at the face is done with picks and shovels through pockets in the front of the shield. If hardpan is encountered, Ingersoll-Rand clay spades are used. When rock occurs in the mixed face, I-R drifters are used to drill blasting holes; these are then filled with du Pont 60 per cent dynamite. During the shove the face is maintained by breast boards supported by face and table jacks. The compressed air balances the water pressure from without, but the breast boards retain a check on the admission of muck.

Muck Excavation

The excavated muck is scooped up by a Conway mucker in each tunnel, driven by a 100-hp electric motor operating on 440 volts. The mucker works along on a 36-inch-gage track and loads side-dump muck cars coupled to it in the rear. Empty cars are held on a side track, and as soon as one car is loaded it is pulled away by a locomotive while trammers shove an empty into position. Goodman 10-ton electric locomotives are used for hauling two or three muck cars at a time.

Cars are taken to the foot of the shaft where they are raised, one at a time, on a 2-car hoist to a gantry platform built above the street level. The 2-car hoist lets one car be raised while another is descending, thus lightening the load on the electric motor. On top of the platform the cars are dumped into a bin. The muck is discharged through a hopper into trucks passing beneath which haul it to designated fill locations throughout Brooklyn.

Alongside the hoist is an open shaft for each tunnel, down which supplies and materials are lowered by an American stiffleg derrick equipped with an 80-foot boom. The derrick can swing over both tunnel shafts and is powered by a Lambert-National 3-drum hoist.

Very little seepage comes through to the tunnel. But a fair amount of water is collected at the heading from the water liners on the drifter drills, from the washing of the ring segments before they are raised into position by the hydraulic erector arm, and from the exhaust of the hydraulic jacks. The water is drained into a sump near the shield and then blown back to the foot of the shaft through a 6-inch pipe. No pumping is necessary in the air chamber. The blow pipe is simply dropped into the sump hole, the inlet valve opened, and the pressure of the air drives the water through the pipe. At the foot of the shaft it empties into another sump. And it is pumped from there to the surface by LaBour electric pumps of which there are 4, 3½, and 2-inch units available for use.

Supply Lines

Besides the 6-inch water-discharge line, the tunnel is serviced with a 440-volt power line for the mucker and a 110-volt line for lighting. Water is supplied to the heading through a 3-inch line for use in the drills or washing the rings, while a 2-inch hydraulic line carries the high-pressure water for the propelling jacks. A 6-inch line conveys high-pressure air, 100 pounds per square inch, to operate air-driven machinery such as winches, hoists, drills, etc. No ventilating pipes are carried back to the air chamber since the compressed air serves that purpose. The low-pressure air is conducted through a 14-inch pipe, with another also strung along the tunnel as a reserve. One of these is advanced to keep pace with the shield while the other is in use.

From this forward working chamber at the heading, air is bled back to the 800-foot section between two sets of locks to maintain a 15-pound pressure. From opening the lock doors or from air

(Continued on next page)



This view shows the east tube of the Flinn Corp. Brooklyn-Battery Tunnel contract. This section is being driven in free air. At the right, from top to bottom, are a telephone line, two light cables for flying-gangway lights, three 110-volt light cables, three 220-volt power cables, two back-pressure lines, two 14-inch low-air lines, and one 2,220-volt power cable for the mucking machine. At the left are a water line, a hydraulic line, a 6-inch high-air line, and a 6-inch blow line.

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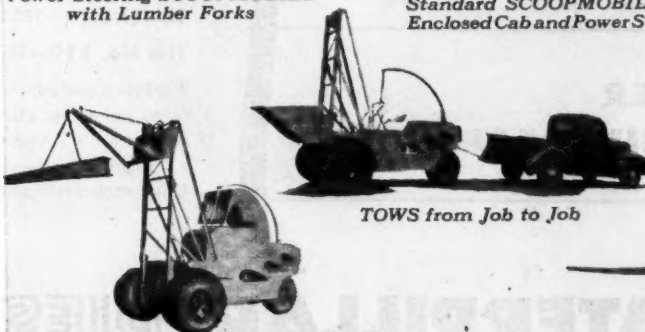
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Cab Model SCOOPMOBILE with Crane Boom Attachment



Standard SCOOPMOBILE with famous Vickers Power Steering

Shield Drives, Lines Two 31-Foot Tunnels

(Continued from preceding page)

seepage, this pressure usually has a tendency to build up beyond 15 pounds and must be released by a valve. This second chamber in which the lower pressure is maintained serves as a safety measure; it also permits other work to be done on the tunnel at a pressure below that needed in the heading.

Within the powerhouse are seven Ingersoll-Rand air compressors, two of which supply the high-pressure air for the operating equipment. Each can furnish 2,030 cfm at 135 pounds per square inch, and they are driven by G-E 450-hp electric motors at 200 rpm. The five low-pressure compressors furnishing the compressed air for the working chambers have a total capacity of 29,300 cfm. Two of these are 5,748-cfm units driven by G-E 625-hp synchronous motors at 180 rpm; two others have a capacity of 6,017 cfm and are operated by Westinghouse 800-hp motors at 189½ rpm; while the fifth is rated at 5,770 cfm, with a G-E 600-hp motor at 180 rpm furnishing the power.

Air is also stored in two large accumulators for use with the two Watson-Stillman hydraulic water pumps which deliver water under heavy pressure to the 28 jacks at each shield. The pumps are operated by G-E 100-hp motors and can maintain pressure of from 5,500 to 6,000 pounds per square inch. At times the maximum pressures have been required in making the shoves.

Progress

In earth face the tunnels progress an average of 8 feet per day; this rate decreases to 3 feet in mixed material. When rock is reached, near the north end of the contract, the tunnels are expected to advance at the rate of 8 feet per day. This latter work can be done in free air, with the shield used only for erecting the cast-iron lining. The Flinn contract will join the Mason & Hanger job, also in rock at that point, which has already been excavated to full section but has not yet been lined.

As the lining is completed, gravel is blown through 2-inch holes in each ring segment to fill the voids between the exterior of the tunnel and the outline of

the excavation. This is followed by grouting and the holes are then plugged. Thus any possible settlement is checked and the tunnels are given an even foundation for their full length.

Quantities and Personnel

Over 1,000 men have been employed at the peak on the George H. Flinn Corp. contract which will total up to around \$16,000,000. Harry Stripling is General Superintendent. The major items include:

Earth excavation, shield	137,100 cu. yds.
Mixed excavation, shield	215,000 cu. yds.
Rock excavation, free air	65,000 cu. yds.
Cast-iron lining rings	56,450 tons
Concrete lining	46,600 cu. yds.

For the Triborough Bridge and Tunnel Authority, D. W. Coe is Resident Engineer on the Brooklyn end of the tunnel project.

The complete tunnel project includes 20-odd contracts, some completed, others under construction, and some not yet awarded. Besides the two tunnel-driving contracts of 4,000' and 3,700 feet between the construction shafts for the

twin tubes, other major contracts include short sections connecting to the portals on the ends to complete the 9,117-foot total tunnel length. This work is cut-and-cover construction of steel bents and reinforced concrete.

The Manhattan section from the construction shaft to the tunnel entrance north of Battery Place was awarded to the joint firms of Gull Contracting Co., Inc., and L. G. Defelice & Son, Inc., of Flushing, N. Y., for \$3,889,976. Similar work on the Brooklyn side from the construction shafts back to the tunnel entrance is being done by E. W. Foley Associates, Inc., for \$2,473,500.

Another major contract for the ventilation shaft off Governors Island is under way by the Grow Construction Co. of New York City for \$3,594,580. Ventilation equipment will be housed here as well as in buildings in Manhattan and Brooklyn. In Manhattan a building north of Battery Place will be for fresh-air supply only; the exhaust equipment will be located in a structure under Battery Park and will have an

exhaust stack above the ground level. The contract for the Manhattan Plaza has not yet been awarded, nor for the ventilation buildings at Governors Island and in Manhattan.

Other contracts yet to be awarded are for paving and finishing the tunnels and installing some of the electrical equipment and pumping and operating equipment. Contracts have been awarded for the Brooklyn ventilation building, ventilating equipment, for switchboards and transformers, and for the manufacture of tile which will be used to line the tunnel ceiling. The Authority will furnish the tile which will be installed by several contractors.

Construction is financed with a loan by the Reconstruction Finance Corp. made in 1940. At that time the estimated cost of plaza-to-plaza construction, exclusive of real estate, was \$57,000,000. But this figure will be revised upwards because of the stoppage caused by the war and post-war conditions. The necessary real estate has been purchased (Concluded on next page)

A new "FIGHTING FOUR"!



Now on the production lines are four new "Caterpillar" Diesel Tractors and Motor Graders—with decisively greater horsepower, strengthened design, and many mechanical refinements. . . . All brought to you in line with "Caterpillar's" policy of building ever better products for a steadily increasing number of satisfied users!

Without appreciable added weight, but with engines of increased piston displacement, still tougher materials, free-flow manifolding, larger crankshafts and numerous other improved features, these new "Caterpillar" Diesels enable

you to handle bigger loads—work at higher average speeds—accomplish more work per day—increase your earnings very substantially.

These important advancements are the result of many months of quiet, patient but intensive "Caterpillar" engineering, metallurgical research, and factory tooling. They are dedicated to your future success and profits. You'll be delighted with the further details your "Caterpillar" dealer will gladly give to you.

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GREATER HORSEPOWER

FASTER WORKING SPEEDS

MANY IMPROVEMENTS

HIGHER EARNING CAPACITY

THE NEW TRACTORS

The D6—65 drawbar horsepower
2600 pounds additional pull in first

The D4—43 drawbar horsepower
1600 pounds additional pull in first

BOTH—36% larger crankshaft journals • 30% larger crankpins • Solid aluminum alloy bearings • Chrome-plated top piston rings • Free-flow manifolding, with individual ports for each cylinder • More effective, single-unit air cleaner • Improved fuel-injection pumps and injection valves • Improved lubricating oil cooling radiator • More effective oil-pressure control • Full-machined cylinder liners, with "no-corrosion" seals

THE NEW MOTOR GRADERS

The No. 12—100 brake horsepower

The No. 112—70 brake horsepower

BOTH—Constant-mesh transmission • Helical gears—for less noise and easier shifting • Arched front axle—for more ground clearance • Steering shock absorber and anti-friction bearings • Improved power-control clutch, with anti-coasting brakes • Other engine refinements as in Tractor engines

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ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

**Melts Faster
Saves More Fuel
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SPEED-MASTER

KETTLE for
BITUMINOUS COMPOUNDS

For tar and asphalt melting and spraying hot bitumen to patch roads and streets. Internal tube oil heating system produces "hot stuff" twice as fast as ordinary kettles and saves half the fuel. Tubes easy to remove and clean.

Capacities—55, 80, 115 and 165 gal., mounted on skids, or on steel wheels, solid rubber or pneumatic tires for hard use and easy trailing. Hand type rotary gear pump or gasoline engine driven pump for power spray, complete with hose and spray bar and tip attachable to any "Speed-Master" Kettle. Write for Catalog No. 661.

HAUCK MANUFACTURING CO.
119-129 Tenth St. • Brooklyn 15, N. Y.



C. & E. M. Photo

A Goodman 10-ton electric locomotive emerges into free air from the material lock on the George H. Flinn section of the Brooklyn-Battery Tunnel. It will take its 3-car train to the foot of the shaft to be raised by hoist to a platform which is above the level of the street.

Shield Drives, Lines Two 31-Foot Tunnels

(Continued from preceding page)

by the City. And the City is also providing certain connections in Manhattan and Brooklyn which include the extension of the West Side Express Highway and Battery Park Underpass. In Brooklyn, the Gowanus Parkway has already been constructed by the Triborough Bridge Authority. Other important connections will be the extension of East River Drive in Manhattan and the Prospect Expressway in Brooklyn.

When completed in 1949, the tunnel will be similar in appearance and operation to the Holland, Lincoln, and Queens Midtown Tunnels now operating in the New York area. The lighting system will differ in that fluorescent tubular lamps, installed continuously along each tunnel wall, have been adopted. This is a departure from the use, as in existing tunnels, of incandescent lamps in light boxes spaced at intervals along the walls. A short test section of the fluorescent lighting has been installed for observation in the Queens Midtown Tunnel, where motorists may have a preview of this type of lighting.

Members of the Triborough Bridge and Tunnel Authority are Robert Moses, Chairman; George V. McLaughlin and Charles G. Meyer, Vice Chairmen. George E. Spargo is General Manager and Ralph Smillie, Chief Engineer. W. McK. Griffin is Deputy Chief Engineer, J. Mechanic is Engineer of Construction, and J. H. Quimby is Engineer of Design.

I-H Personnel Changes

International Harvester has announced several changes in the personnel of its motor-truck branches. A. C. Lanham has been appointed Assistant Branch Manager at Salt Lake City. F. R. Kemple has been appointed Retail Sales Manager at Indianapolis. A. F. Jackson has been transferred to Tulsa, Okla., as Assistant Manager.

B. M. Kaiser has been appointed Southwest District Manager of motor

trucks. J. T. Sullivan, who formerly held that position, has been transferred

to the Eastern District as Manager in that territory. J. D. Richardson has been put in charge of the company's separate motor-truck branch recently established at Omaha, Nebr. He formerly was Assistant Manager of the company's local combination branch.

Also, L. W. Madery has been appointed Assistant Manager at the Indianapolis general-line branch. H. E. Broadwell has been appointed Assistant Branch Manager at the Billings, Mont., combination branch. J. W. Cooper has been appointed Manager of the parts depot at Baltimore, scheduled to open in July.

Colored Joint Seal

Rubberized joint-sealing compound is now available in various colors, announces Servicised Products Corp., 6051 W. 65th St., Chicago 38, Ill. The compound, known as Para-Plastic, is a hot-pour rubber seal for use in expansion joints on all types of concrete construc-

tion. Colors available are red, green, gray, cream, and yellow. Para-Plastic conforms to Federal Specification SS-F-336.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 33.

Electric-Generator Data

A line of electric generating plants varying in capacity from 500 to 17,000 watts is described in Catalog 594 issued by the Master Vibrator Co., P. O. Box 657, Dayton 1, Ohio. These plants are driven by gasoline or diesel fuel engines. There are 22 basic sizes available in types to meet ac or dc power requirements.

The catalog describes the features of construction and performance for each of the basic types. It gives the output of the generators, and lists the requirements of the engine driving them.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 51.

BUILT FOR BIG LEAGUE

digging



THEW LORAIN 820 FEATURES

- Hydraulic clutch prevents engine stalling under any digging circumstances—cushions and absorbs digging shocks and impacts—saving machinery and cable.
- Turntable Center Drive Design permits full concentration of power on any one operation—or proper distribution of power over 2 or 3 simultaneous operations.
- Two-piece swing drums on roller bearings
- Extra wide crowd clutch mounted on anti-friction bearings
- 2-speed chain drive crawler
- Plenty of crawler length (15' 6"), width and weight
- Oil-enclosed crawler gear case
- 4-way crawler travel and safety lock
- Drop forged crawler treads
- All-welded steel boom and dipper stick
- Automatic power dipper trip

WHETHER it's a major, big yardage contract or a short stretch of murderous rock digging, the Lorain-820 is the consistent choice of experienced contractors. Every component of this 2-yd. machine—crawler, turntable, shovel boom—is designed not only for strength but to utilize its great power wisely and well. The result—a fast digging, nimble moving, heavy-duty machine that will work with the same zing and zest on the final stages of a difficult job as it did at the start.

If you have work ahead that calls for big league shovel or crane performance from start to finish, you'll want all the facts about the Lorain-820. Your local Thew-Lorain distributor has them ready and waiting for you.

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LORAIN, OHIO

Thew Reg. Trade Mark
Lorain 820

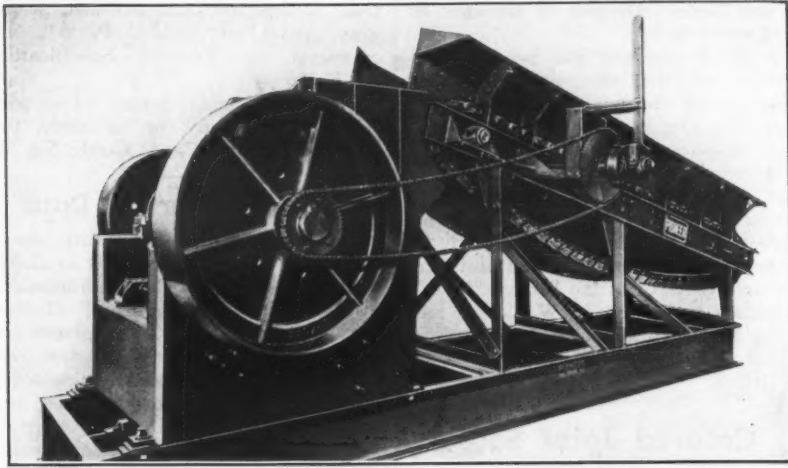
"BICKNELL BETTER BUILT" PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

BICKNELL MANUFACTURING CO.
12 LIME STREET ROCKLAND, MAINE



This 14-foot-long model of the new Pioneer apron feeder is installed to feed a primary breaker. It is arranged for clutch control from an operator's platform.

Apron-Feeder Unit Made in Nine Styles

An apron feeder built around a basic unit assembly without sideboards is the latest addition to the line made by Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.

The feeder can also be furnished with vertical or with flared sideboards. Each of these three models, in turn, can be furnished with any one of three drives: for gear motor, for conveyor drive, or for drive from the crusher. This provides nine combinations of the feeder, which can be secured in five lengths from 6 to 14 feet, and in four widths from 30 to 48 inches.

The pans are 1/2-inch forged-steel plate, formed to overlap and impart strength and rigidity. These overlapping pans, together with the sideboards, provide a continuous path for the materials and reduce spillage, the manufacturer says. The overlapped pans also provide a corrugated surface to prevent slippage under the load.

Interlocking malleable castings, bolted to the pan ends, form a continuous wall along each edge of the feeder bed to reduce spillage further. The pans are carried on heavy chains which, in turn, are supported on large idler rollers. The end shafts are of large diameter to give ample bearing surface, and turn in heavy babbit bearings. Grease fittings are accessible for adequate lubrication.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 1.

Catalog on Magnetos

A spiral-bound catalog containing over 100 pages of magneto information is being distributed by the American Bosch Corp., 3700 Main St., Springfield 7, Mass. It is known as Form No. 2325 A.

The booklet begins with an article on when to repair and when to replace old magnetos, and another giving the "inside story" of American Bosch magnetos. The rest of the catalog is devoted to lists of recommended sizes of magnetos for all standard-make engines, conversion tables showing the parts required to change from one variation to another, and installation data. Also included are price lists and a list of installation numbers.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 56.

New Wood-Treating Plant

The opening of a plant designed for alloying wood with creosote, Wolman salts, and Minalith flameproofing salts has been announced by the American Lumber & Treating Co. The new plant is located on Chesapeake Bay in Baltimore's Fairfield industrial district; it covers approximately 5 acres. Three steel vacuum-pressure treating cylinders, said to be capable of handling an average of a carload of lumber each,

have been installed.

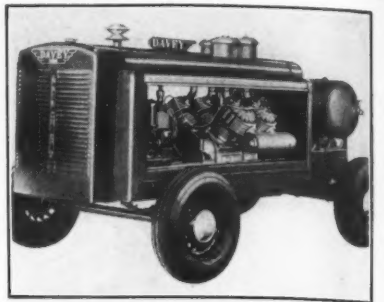
The plant's sales will be handled by the company's office at 831 Southern Bldg., Washington, D. C.

Air Compressor Made With Three Mountings

Production of a V-type 160-cubic-foot portable air compressor has been announced by the Davey Compressor Co., Kent, Ohio. Known as the Model 160 Air Chief, it is available in standard skid, steel-wheel trailer, and pneumatic-tire trailer mountings. On trailers, spring mounting is included without extra cost. Flanged-wheel units are also manufactured for railroad work.

The compressor is of double V-type design, with three low-pressure cylinders and one high-pressure cylinder. All cylinders have a 5 3/4-inch bore and 4-inch stroke. Overall length of the unit built as a trailer is 127 inches, height is 70 inches, and width is 72 3/4 inches. It weighs 4,640 pounds and has a turning radius of 35 feet. Standard gasoline units are equipped with Hercules JXD engines.

The units are made with aluminum-alloy heads and aluminum crankcases. A pressure equalizer is installed to re-

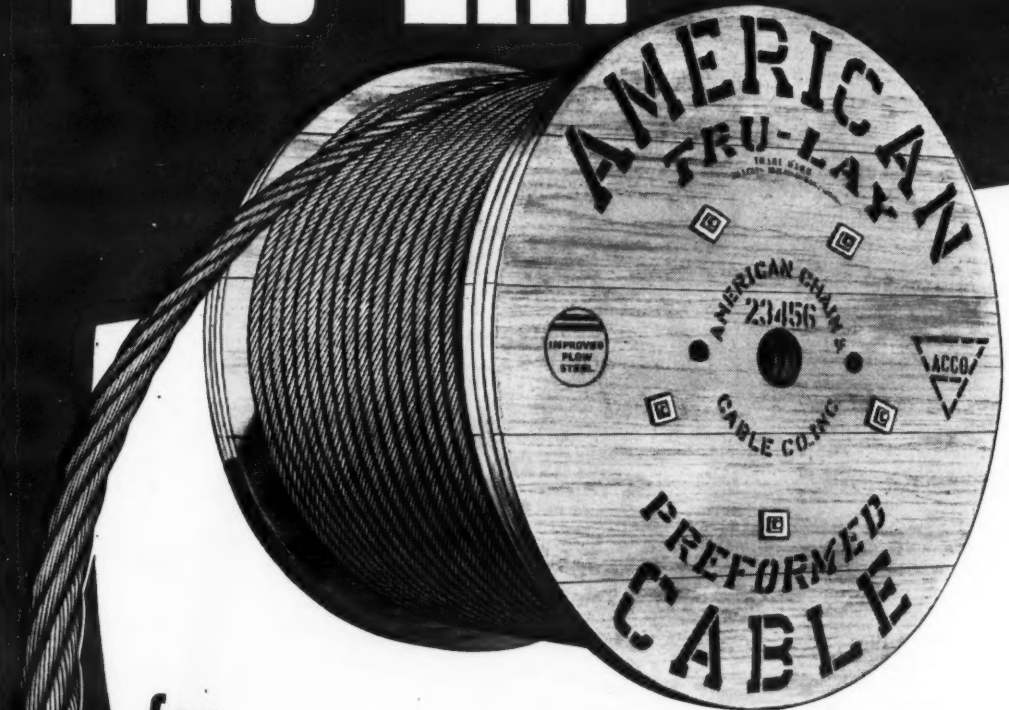


Shown here with a pneumatic-tire trailer mounting, the new Davey Air Chief is a 160-cubic-foot V-type portable air compressor. It also comes with standard skid and steel-wheel trailer mountings.

lieve crankcase pressure. Side tool boxes are included in all models as regular equipment. The three low-pressure cylinders are fitted with individual air cleaners said to provide extra cooling during idling periods.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 36.

TRU-LAY *Preformed*



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DRAG LINES

Because American Cable TRU-LAY is preformed, the wires and strands are free from internal strain. This makes TRU-LAY a limber rope, ready for fast unwinding. It whips less — runs out truer. Your men get better casts. They can make top speed with the load, too, because it is a characteristic of TRU-LAY Preformed to spool smoothly on the drum. Being an extremely flexible line, TRU-LAY Preformed better withstands bending fatigue and so lasts longer, steadies machine production, moves more yards per rope, gives greater dollar value. If you have drag-line work to do, by all means specify TRU-LAY Preformed of Improved Plow Steel.

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"WE AGREE— FORD TRUCKS LAST LONGER!"

Mr. Robert S. Swanson, treasurer, S. B. Thomas, Inc., Long Island City, N. Y., wrote recently: "In our fleet of 128 Ford Trucks, 36 are over 10 years old, and 6 are 1932 models—14 years old! Their reliability and economy have given us good reason to be thankful that Ford Trucks Last Longer."

THE 6
YOUR PICK OF POWER
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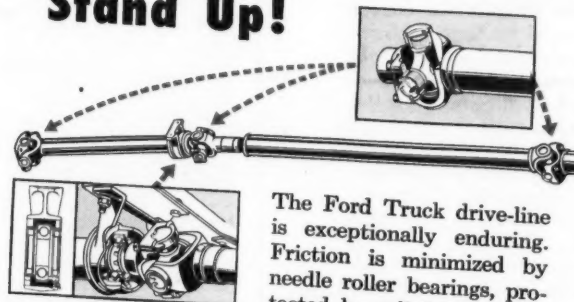


Tens of thousands of Ford Trucks have proved their endurance in the tough service of handling bulk building materials, ores, earth and coal. This 2-ton Dump Truck chassis carries a 3- to 4-yard heavy duty body and hoist by St. Paul Hydraulic Hoist Division of Gar Wood Industries, Minneapolis, Minnesota.



ONLY FORD GIVES YOU ALL THESE LONG-LIFE TRUCK FEATURES: Either of two great engines, the V-8 or the SIX, both with full pressure lubrication to all main, connecting-rod and camshaft bearings, Flightlight oil-saving 4-ring pistons, precision-type heat-resistant bearings and fast-warmup temperature control • rear axle design that takes all weight load off the shafts ($\frac{3}{4}$ -floating in half ton units, full-floating in all others) • heavy channel section frames, doubled between springs in heavy duty models • big, self-centering brakes, with heavy, cast drum surfaces, non-warping

ONE Big Reason— Ford Drive-Line Units Stand Up!



The Ford Truck drive-line is exceptionally enduring. Friction is minimized by needle roller bearings, protected by relief fittings, in all universal joints in all models. Half-ton chassis have two such joints. All other models (except 101" w.b.) have three, and, in addition, a heavy duty ball center bearing. This bearing is self-aligning—cushion-mounted in live rubber. It is leakproof, excluding dust and water. It is unaffected by frame flexing and is notably long-lived. Large-diameter tubular steel propeller shafts with forged ends are properly balanced. This assures freedom from destructive vibration and great strength without excess weight.



and score-resistant—all told, more than fifty such examples of Ford endurance-engineering.

NATURALLY, FORD TRUCKS LAST LONGER! Latest 1946 registration figures show that 78% of all 1936 model Ford Trucks in use 9 years ago are still on the job! That's up to 15.8% better than the records of the next four sales leaders—5% better than the average of all four. More than 100 body-chassis combinations. See your Ford Dealer!

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

Grade Reduction On New Highway

Old Road Is Widened and Relocated Through Clay And Sand for 4.8 Miles On \$267,346 Grading Job

GRADES were reduced from 8 to a maximum of 5 per cent on a \$270,000 highway reconstruction and relocation project in central Wisconsin. This 4.858-mile heavy-grading job involved 430,000 cubic yards of unclassified excavation. And tractor-scraper and self-propelled scraper units averaged some 800 cubic yards a day through six big cuts of sand and clay.

Bids for rebuilding the Durand-Ellsworth Road in Pepin County—Federal Aid Project F-401 (11)—were received by the State Highway Commission at Madison early last summer. The contract was awarded to the Fletcher Construction Co. of Menomonie on its low bid of \$267,346. The successful bidder's principal item was 429,077 cubic yards of unclassified excavation which was bid in at 28 cents per cubic yard.

The Durand-Ellsworth Road is a moderately traveled highway through rich farm and dairy country. The old road had become increasingly inadequate for both private and commercial traffic. It had a shoulder-to-shoulder width of 26 feet with a 24-foot bituminous wearing course laid over a shale base. Worse than its width were the twisting, blind curves through the hilly country with grades up to 8 per cent. The worst of the grades and curves have been eliminated by $\frac{3}{4}$ mile of relocation at the west end of the job. With the exception of this relocation, the reconstructed grade follows the center line of the old road.

When completed, the rebuilt highway will have a shoulder-to-shoulder width of 41 feet for about $1\frac{1}{2}$ miles; for the rest of the distance, the width will be 38 feet. The final wearing course of bitumen, to be laid under another contract, will be 36 and 32 feet wide in the two sections respectively.

Principal Quantities

Principal quantities on the Fletcher contract included:

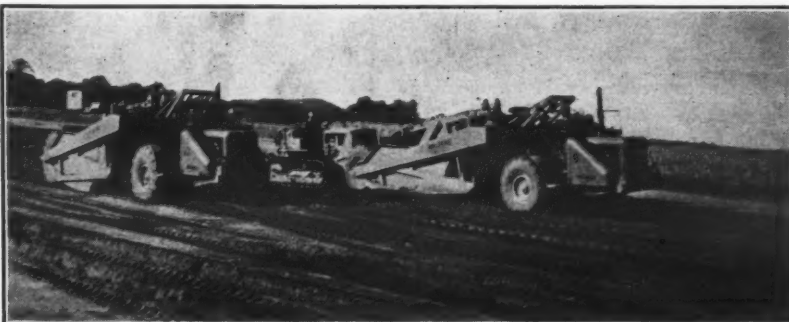
Clearing	66 stations
Grubbing	67 stations
Unclassified excavation	429,077 cu. yds.
Finishing roadway	260 stations
Gravel surfacing	5,140 cu. yds.

In addition, the contract included two timber and steel structures and one reinforced-concrete structure, all of which were sublet to Robert Hinman of Glenwood City. Difficulties in obtaining materials delayed this work.

Work Starts

It was a short run of only 20 miles from the home office and equipment yard of the Fletcher Construction Co. at Menomonie to the job site. On July 9, Tom McEneaney, Construction Superintendent for the contractor, had most of his dirt-moving equipment ready to work and was driving blue-tops with his faithful "Old Skulldigger".

A word about "Old Skulldigger". This ancient hand axe has been owned and used by veteran road builder Tom McEneaney since 1897. It has matched more blue-tops to grade than any piece of modern grading equipment. After a little more than a month of work on this job, a mechanic attempted to drive a shaft with the axe; the head shivered and split. "Old Skulldigger" was retired from active service on September 16, 1946. The fracture was bound with a piece of string and the venerable tool found a place of honor, temporarily, on the wall of the trailer field office. "Temporarily" meant until Division



C. & E. M. Photo

These Wooldridge Terra-Cobras were two of three self-propelled units used by Fletcher Construction Co. for hauls over $\frac{1}{4}$ mile on the Durand-Ellsworth project. At this shallow cut near the east end, they hauled fill for about a mile.

Engineer W. F. Baumgartner of Eau Claire could find a suitable display case in a position of honor in his office.

Moving Dirt

As clearing and grubbing were completed, the contractor moved into the $\frac{3}{4}$ -mile relocation section at the west end of the project with 3 LeTourneau

12-yard scrapers with Caterpillar D8 tractors. He started building up the new grade over a balanced cut and fill section. Just below this section was a 1,000-foot cut to a maximum depth of 30 feet with another balanced fill area of 1,000 feet.

The soil in the relocation area is a light sand; in the section below with the

1,000-foot cut and 1,000-foot fill, the soil is clay. Together these gave the contractor ideal soils in which to work regardless of weather, and very little time was lost even for heavy rain.

At this particular area there was a good deal of soil substitution. In the heavy clay cut, scrapers excavated a foot below grade at center line and 16 inches at the shoulders, refilling with sand from the relocation section. Although no compaction was required other than that obtained from passage of the heavy equipment over the grade, the subgrade was stabilized to a good degree through substitution of the soils.

Shoulder slopes vary from 4 to 1 to 2 to 1 on the reconstructed road, and streamlined backslopes vary from 2 to 1 to 10 to 1. A Caterpillar D7 tractor with an Ateco 5-yard scraper, and a Caterpillar D7 and D4 with dozers were assigned the job of shoulder sloping.

Self-Propelled Units

Although the average haul on the job (Concluded on next page, Col. 4)

Tune in . . .
TEXACO STAR THEATRE
presents the NEW
TONY MARTIN SHOW
every Sunday night.
See newspaper for time
and station.



TEXACO

Steam-Cleaning Unit Has 2-Gun Operation

New design improvements in the Oakite-Vapor Cleaning Unit have been announced by Oakite Products, Inc., 172 Thames St., New York 6, N. Y. At the same time, the company also announced that these cleaners are available for immediate delivery.

The unit is an enclosed-coil type of steam generator with a down-draft flame. It is said to deliver a hot vaporized spray in either wet or dry state under pressures up to 200 pounds. Sufficient pressure is developed to operate two steam guns at once, the manufacturer says.

Incorporated in the improved model are a simplified grouping of gages and controls; a redesigned piping system; and a compressed-air valve accessory for two-minute anti-freezing of the water-steam system.

Units are available in stationary models, mounted on shop-wheel chassis, or mounted on trailer-type chassis. The



C. & E. M. Photo

From left to right are W. F. Baumgartner, Division Engineer of the Wisconsin State Highway Commission; Tom McEneaney, Construction Superintendent for Fletcher Construction Co.; and A. L. Kotz, Resident Engineer of the Highway Commission.

standard electric motor is a ¾-hp 60-cycle 110 to 220-volt ac unit. Power may be furnished for special applications by special ¾-hp electric motors or

by gasoline engines.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 32.

Grades Are Reduced On Relocated Highway

(Continued from preceding page)

was approximately 1,000 feet, there were several sections along the project involving hauls of more than ½ mile. And at the east end of the project, scrapers worked from a shallow hilltop cut down over a fill section for a haul of about a mile. Three self-propelled scraper units were used for all hauls of more than ½ mile; these units were a Tournapull with a 12-yard Carryall and two 14-yard Wooldridge Terra-Cobras. The self-propelled units averaged a round trip every 10 minutes on hauls of about ¾ mile. A D8 pusher tractor assisted the self-propelled units in loading and a D7 assisted the tractor-scraper units. The six scrapers maintained a daily average of 800 yards.

Cuts and Courses

Over the 4.8 miles of the grading project through rolling country, the scrapers worked in six large cuts to balanced fills, plus several shallow cuts. Largest cuts included one with 91,000 cubic yards of excavation and two with 80,000 cubic yards of excavation.

Maximum cut depth was 30 feet.

The grade for the new highway included an 8-inch base course, compacted by the equipment, with a 2-inch surface course, similarly compacted. The base course of 29,673 cubic yards of graded aggregate will be topped with 5,140 cubic yards of traffic-bound surface base course. The slope on the new grade will be ¼ inch per foot.

Equipment Maintenance

Although the contractor's main equipment yard is located only a few miles from the job, two mechanics were employed at the site to maintain the dirt movers in prime condition. All equipment was lubricated at least once every shift with Alemite volume guns, and a Westinghouse electric welder stood by to aid in minor repairs.

All scrapers were cable-controlled, and the contractor elected to use a preformed-type wire rope on these units for longer life and greater ease in handling. The preference for preformed wire rope was also based on the fact that the overhead lines on some of the scrapers vibrated at an alarming rate during pusher loading. The tension-free strands in the preformed cables did not fatigue under this continual whipping.

When major breakdowns did occur, the equipment was taken to the main yard at Menomonie and repaired with a minimum time loss from productive operation.

Personnel

The Fletcher Construction Co. employed an average of 22 men, working a 10½-hour shift 6 days a week. Work started on July 9, and 250 calendar days were allowed for completion of the new grade. The reconstructed road is designed for a final wearing course of 2-inch bituminous mat.

In charge of construction operations for the contractor was Tom McEneaney of Menomonie. Resident Engineer for the Wisconsin State Highway Commission is A. L. Kotz of Eau Claire, while the Division Engineer for the Commission is W. F. Baumgartner, also of Eau Claire.

Worthington Official Dies

The death of Harry C. Beaver has been announced by the Worthington Pump & Machinery Corp., Harrison, N. J. At the time of his death, Mr. Beaver was Vice Chairman of the Board of Directors. He has been associated with the company since 1931, and was a former President.

OPERATING COSTS

EFFECTIVE lubrication cuts operating costs of heavy-duty Diesel and gasoline engines by assuring efficiency . . . reducing out-of-service time for repairs and overhauls . . . keeping fuel consumption low. You get all these benefits of effective lubrication with *Texaco Ursa Oil X***.

*Texaco Ursa Oil X*** is fully detergent, dispersive, resistant to oxidation . . . made to keep engines clean . . . free from power-stealing sludge, varnish, carbon. *Ursa Oil X*** keeps valves lively and rings free . . . protects parts against wear and bearings against corrosion.

Texaco has lubricants and fuels for all contractors' needs . . . and a Simplified Lubrication Plan that adds economy to improved performance. Call the nearest of the more than 2500 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

MAKE YOUR EQUIPMENT LAST LONGER

Lubricate trucks, tractors, graders, shovels and other equipment with the world-famous chassis lubricant — *Texaco Marfak*. It's longer lasting because it won't squeeze out under heavy loads, won't jar out in rough service. *Marfak* seals out dirt and moisture, too . . . protects parts better with fewer applications.

More than 250 million pounds of *Marfak* have been used to date!

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT



This Jeterete gun shoots concrete into place by compressed air. It is a product of the Construction Machinery Sales Co., Waterloo, Iowa.

Gun Places Concrete Mix Under Pressure

A gun for shooting concrete into place by the use of compressed air is announced by Construction Machinery Sales Co., 1939 Loveall St., Waterloo, Iowa. One of the features claimed for this unit is that hydration takes place at the nozzle; therefore, the amount of time between hydration and the actual placing of the concrete is reduced to only a fraction of a second. Moreover, extra density is said to result from the impact of placing.

In operation, graded aggregate and cement are pre-mixed and placed in the gun hopper. The gun-feeding mechanism receives it from there, at atmospheric pressure, and passes it to a distributor. There the material is fed rapidly but in small amounts into the air stream of the material hose. And it is then carried at approximately 400 linear feet per second to the applying end.

The applying end is a nozzle. In its base is a water ring connected to a water hose. The ring contains nine small holes through which small streams of water shoot into the stream of cement and aggregate at about 70-pound pressure. The water is controlled by a valve.

The CMC Jeterete gun is made in three models. Model 200C is complete with power plant and a 240-cubic-foot compressor. It has a four-speed transmission, the fourth speed delivering up to 4 cubic yards per hour. The Model 200 is the same as the 200C with the exception that a separate compressor is needed. This must be capable of delivering 210 cubic feet of free air per minute at 60-pound pressure. It can handle lengths of hose up to 200 feet in high speed and up to 400 or 500 feet in second or third speed, according to the manufacturer.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 4.

Welding Products Catalog

Publication of a 64-page catalog on welding and cutting products has been announced by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. The catalog is divided into two sections: the first covers oxyacetylene welding and cutting gases, equipment, and supplies; the second section deals with arc-welding machines, accessories, and electrodes.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 90.

Viles Opens Idaho Branch

A new branch has been opened in Lewiston, Idaho, by Fred M. Viles & Co., Inc., Spokane dealer in construction equipment. The new branch will cover the following counties in Idaho: Idaho, Latah, Clearwater, Nez Perce, and Lewis. In addition, the company covers Asotin, Columbia, and Walla Walla Counties in Washington; and Union and Wallowa in Oregon.

Present floor space at Lewiston is 2,500 feet, but it is planned to triple

that. Allis-Chalmers and General Motors repair parts and equipment service will be available.

Data on Piles, Caissons

A bulletin on concrete piles and caissons is now available from the Western Concrete Pile Corp., 2 Park Ave., New York 16, N.Y. The bulletin describes six types of piles and caissons made by this concern: button-bottom pile, projectile pile, composite pile, compressed-concrete pile, caisson pile, and Drilled-In Caisson. The features of each are listed.

A separate page is devoted to each type of pile. It tells the story of forming and driving it, its advantages, and its specifications. Also included in the bulletin is a short discussion on the column versus the taper and a formula for determining the proper working load on any pile.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 70.

A Roller For Every Job

Sturdy, heavy-duty rollers, engineered to stand up under the toughest conditions. Pierce-Bear Tandem Rollers are powered by economical Allis-Chalmers 4-cylinder industrial type gasoline engines. Variable weights, from 3½ to 5 tons with built-in water tanks for ballast and wet rolling.



Pierce Baby Bear 2½-3 tons



Pierce Medium Bear 3½-5 tons

The new 2½-3-ton Pierce Baby Bear is designed for close-in work and small area maintenance. It works against a curb up to 25 inches high and within 1½ inches of a higher wall or building. Final drive is within the rear roll. Use Pierce-Bear Tandem Rollers for all-around performance. Write for folder.

Pierce-Bear Rollers Lewis Manufacturing Company

415 Hoefgen Avenue—San Antonio 6, Texas

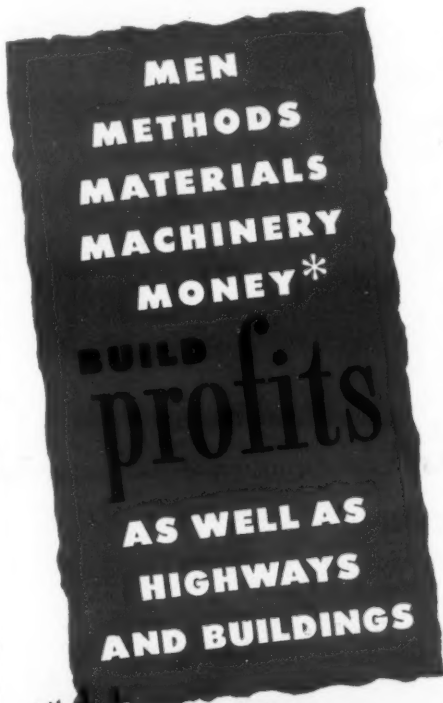
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Profits will depend on how well you employ the combination of men, methods, materials and machinery in your business. Their services and uses cost money! Payrolls to meet, supplies to buy, transportation costs, bonds, insurance—all the items that put a heavy strain on working funds.

Now, how about the machinery and equipment needed to handle the work to best advantage? Do you have enough surplus funds to buy without handicapping yourself? Would additional capital help you acquire the equipment that helps you build profits? If so, C. I. T. WILL FURNISH THE FUNDS, promptly and at reasonable cost.

Ours is a simple, straightforward offer: When you buy construction equipment, we will finance the purchase on terms which spread payments over many months. Get in touch with any of these offices for rates, terms and full information. There's no obligation and our services can be the means of building up profits for you.



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Roadside Grasses Studied by State

Test Plot May Forecast Proper Grass Species, Type of Mulch, and Time Of Year for Planting

By FRED R. BRUTO, formerly Roadside Engineer, Missouri State Highway Commission

SOIL conservation has become an important state and national policy. The administrators of public land especially are expected to adopt and perfect measures designed to prevent soil erosion on all lands under their control, and also on the land adjacent to these areas.

State and Federal agencies engaged in the construction and maintenance of highways are particularly concerned with the problem of soil conservation.

The grading and excavation necessary to secure proper alignment, elevation, and cross section of a highway disrupt the natural drainage, destroy the existing protective cover of vegetation, and so change the natural repose of the land that areas which were perfectly stable become vulnerable to erosion.

Seeding for Erosion Control

The most satisfactory device for controlling soil erosion on roadsides is the establishment of a dense low-growing vegetative cover where one must consider the presence of utilities, the overall cost, the need for good landscaping, and the use of materials which will aid rather than interfere with maintenance operations.

However, establishing and maintaining this vegetative cover on roadsides after a highway is constructed present a special problem, because:

1. The removal of fertile topsoil in grading operations creates an unfavorable soil in which to establish seed.
2. Erosion on steep slopes makes it difficult to hold seed, soil mulch, and grass seedlings in place.
3. The season during which seeding is most favorable for the contractor often is unfavorable for plant establishment.

To solve this problem, additional information is needed on the effect of mulching materials, applied at different rates and used with grass seedings made at all times of the year. A plan for studying this problem has been outlined by a sub-committee of the Committee on Roadside Development of the Highway Research Board.

The plan as outlined provides for the establishment of field test plots to be located on highway roadsides, under the dual control of the Highway Department Engineer and the Agronomist of the State Agricultural Experiment Station. It provides for the materials, labor, and equipment to be financed by the State Highway Department.

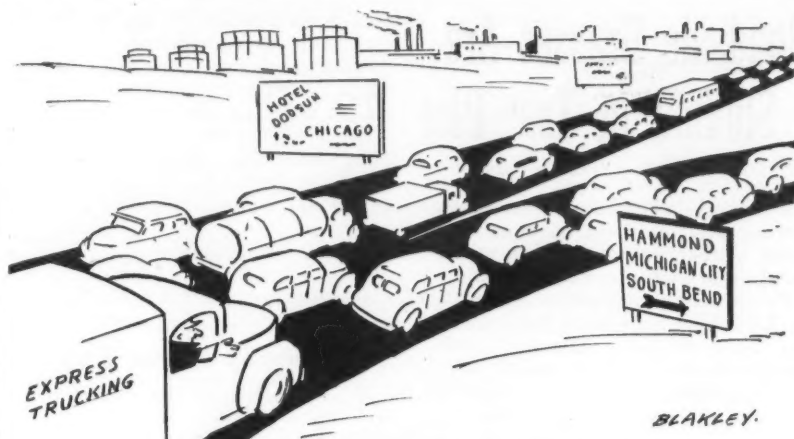
Grass seedings are to be made each month from March to October as well as once in midwinter. And observations are to be made at appropriate time in-

tervals throughout the year by a competent observer. Temperature and rainfall are to be recorded by means of automatic recording gages. Similar seedings are to be made each year for a period of several years in order to determine the effect of variable weather.

Various mulching materials are to be tested, including cut-back asphalt, sawdust, and roadside grasses mowed after they have matured their seed so that the mowings will furnish their own seed. It is hoped that several states will undertake this research work.

Year-Round Seeding Practical?

In Missouri the establishment of a low-growing vegetative cover on the roadsides to prevent soil erosion consists largely in preparing the soil, seeding with grass and legume seed, and mulching with straw. There is, however, some question as to whether this work should be done by contract or by state forces, and at the present time both ways are being used.



"Aw nuts! Now we'll HAVE to go to Hammond."

It is generally thought that most contractors operating in Missouri do not care to have seeding and mulching items on the original contract; the reason for this is the seasonal nature of the work. This supposition is borne

out by the high bids contractors submit for doing such work. In order to make the seeding and mulching items more interesting to contractors and thus secure more competition in bidding for

(Concluded on next page)

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for **SPEED**
MOBILITY
ALL-AROUND
COST REDUCTION



Wherever free-flowing bulk materials are handled, the new B-G 545 pneumatic-tired Bucket Loader is *right*. It's big and fast—loads at a high production pace. It's easy to put to work in just the *right* spot—turns in its own length, has the power and traction to crowd into the bank and has a high speed reverse for faster travel around the yard. Simple, centralized controls; electric starter; hard-

lipped buckets; it's engineered throughout to meet up-to-the-minute demands.

The best is never easy to get. Naturally, there is a heavy demand for the 545. That's why we suggest that if you can look ahead to the time you, too, will need one—see your Barber-Greene distributor now. Barber-Greene Company, Aurora, Illinois.



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Constant Flow Equipment



LOADERS

PERMANENT CONVEYORS

PORTABLE CONVEYORS

COAL MACHINES

BITUMINOUS PLANTS

FINISHERS

DITCHERS



Roadside Grasses Are Studied in Test Plot

(Continued from preceding page)

these items, it has been suggested that seeding and mulching be done at all times of the year rather than at seasonal times such as spring and fall.

To test the practicability of seeding at all times of the year under a protective mulch, seed-test plots were established at various locations and the seeding was done at various times from early spring to the middle of July.

Specific Test Plot

Of particular interest is the test plot located near Springfield, Mo. This area is 120 x 500 feet and consists of five sections 120 x 100 feet each. Each section was mulched with a different material and fertilized half with dried sewage and half with 4-12-4 commercial fertilizer. Mulching materials were sawdust, roadside mowings, straw, and 0.2 and 0.4 gallon of cut-back asphalt per square yard.

Fifteen strips 8 feet wide and 500 feet long crossed the entire field so that part of each strip was under each of the various mulches and fertilizers. These strips were numbered 1 to 15 and the following seeds were sown in each:

1. Downy brome—sweet clover
2. Siberian millet—winter vetch
3. Hog millet—winter vetch
4. Bermuda—yellow hop clover
5. Crab grass—Ladino clover
6. Little bluestem—white sweet clover
7. Quack grass—wild Kent clover
8. Canada bluegrass—white clover
9. Timothy—red clover
10. Alta fescue—Lespedeza sericea
11. Smooth brome—alfalfa
12. Orchard grass—crimson clover
13. Switch grass—yellow sweet clover
14. Meadow oat grass—alsike clover
15. Kentucky blue, redtop—Korean Lespedeza.

The entire field was limed 3 tons per acre and seeded at the rate of 50 pounds per acre. Sewage was used at the rate of 5 tons per acre and 4-12-4 at the rate of 500 pounds per acre. Straw mulch was 3 tons per acre; roadside mowings 3 tons per acre; and sawdust 15 tons per acre. The sawdust was treated with a pound of Nitraprill or ammonium nitrate to 20 pounds of sawdust. The seeding was done on July 17, 1945.

Excellent emergence and growth was observed in 1945 on all sections except where the 0.4 gallon cut-back asphalt was used. The 0.2 gallon cut-back asphalt plot showed excellent results. Continued excellent growth was observed in 1946. Bermuda and hop clover showed best under the asphalt mulch. Alta fescue showed well under all mulches. All legumes did exceptionally well. Such good results were obtained, that seeding out of season was considered worthy of further study.

Printer-Developer

Gives Large Volume

A new Model 91 BW Volumatic printer-developer has been announced by Charles Bruning Co., Inc., 4700 W. Montrose Ave., Chicago 41, Ill. It is intended for large-volume production of cut sheets and will handle roll stock up to 42 inches wide.

Said to produce prints at a rate of 30 feet per minute, it prints and develops all Bruning BW mediums. These include light, regular, or card-weight BW paper prints, with black or colored lines on white backgrounds; black or colored-line paper prints on green-tinted backgrounds; transparent paper prints; cloth or film prints.

The feed board provides over 13 square feet of working space. Copy and medium are drawn in by a vacuum feed. Light is provided by a stationary 75-watt-per-inch mercury arc light, and a light-shield control knob permits the operator to reduce light exposure in any percentage up to 50. For producing

photographic prints, a Copyflex fluorescent lamp can be installed.

Another feature of the Bruning printer is a tracing and print separator said to provide automatic separation of original copy from the sensitized medium. Suction is applied to the sensitized medium while, at the same time, an air stream separates the original copy from it.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 5.

Hydraulic Power Tools

The line of hydraulic power tools made by the Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 1, Wis., is described in a new 24-page catalog. The basic Porto-Power tool is a hydraulic jack to which many supplementary tools can be attached. It is made in 2, 4, 7, 10, 20, and 50-ton sizes.

The No. P-46 bulletin shows how portable hydraulic power tools with attachments can be used in the shop and

on the job for push, pull, press, clamp, bend, and lift operations. Pipe benders are described, as well as gage equipment which adapts hydraulic power to

laboratory uses.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 73.

Use DAREX AEA

For air-entraining concrete

Safe and easy to use Gives controlled air

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CAMBRIDGE 40, MASS.



"Reminds me of my Rex Pump!"

A Rex "Easy-Flow" Pump is "Old Faithful," around any construction job. Just spot it, start it, and forget it. That's all there is to it. Rex will keep right on pumping as long as there's water in the hole... not for just one job or for one season, but for many a year of tough, dependable service.

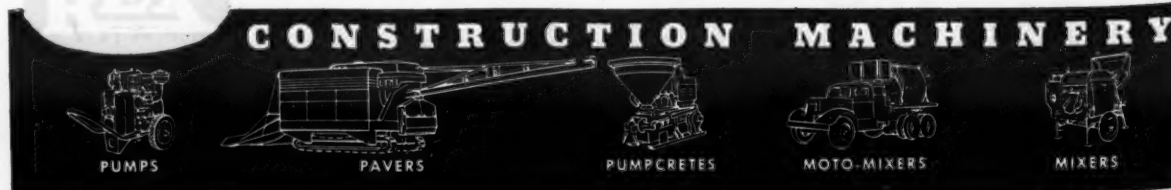
With their new press-formed bodies, Rex Pumps are exceptionally portable...

light in weight yet extremely durable. The smooth surfaces of the press-formed body and volute speed the flow of water through the pump. It's the fastest priming, most efficient, most thoroughly dependable pump in the field.

See them at your local Rex Distributor or write Chain Belt Company, 1666 West Bruce Street, Milwaukee 4, Wisconsin, for all the facts.



CHAIN BELT COMPANY of MILWAUKEE





C. & E. M. Photos

A Caterpillar No. 12 motor grader blades embankment sand in a thin lift for watering. And a pneumatic-tire roller works it down to good densities. Thin lifts, heavy watering, and constant pneumatic rolling were necessary on the White Co. experimental contract for a low-cost secondary road between Yuma and Somerton, Ariz.

Road-Mixed Base

(Continued from page 1)

able, are possible. The State Highway Department of Arizona and the Bureau of Public Roads are the interested parties. They have contributed \$178,732.70 to make the 9.02-mile job possible.

Set on a heavily compacted select-sand base, the new farm road between Yuma and Somerton, Ariz., has a 3½-inch bituminous-stabilized base 25 feet wide. The wearing course is crowned about 0.015 inch to allow for surface runoff, though rain is no problem at Yuma. Arizona Highway Department officials point out that the new job should be considered as a highway base, rather than finished paving. While the bituminous-stabilized blow-sand may have to take traffic for several years, the State hopes ultimately to lay high-type surfacing over the top of this job.

Low-Cost Roads Needed

The present contract was urgently needed to replace the obsolete 15-foot macadam and graded-earth county highway between Yuma and Somerton. But there was another vital issue at stake. Could high-strength secondary roads be built at low cost? Many states are interested in the answer to that question. For Arizona, as for many other states, the answer is, "Not unless you can use local native material."

Arizona has experimented from time to time with sand bases stabilized with portland cement. But wherever portland cement was used as the stabilizing agent, invariably the earth had to be selected very carefully. Guided by years of experience in highway building through desert country, Arizona's highway engineers believed it possible to

put strength into a sand embankment and then make a satisfactory oil mat out of sand so fine that up to 20 per cent passed the 200-mesh screen.

With the job 80 per cent complete in mid-January when *CONTRACTORS AND ENGINEERS MONTHLY's* Western Editor visited it, it seemed to be working out

successfully. Almost half the bituminous mat had been mixed and rolled. Working in extremely fine harmony, Resident Engineer J. B. Rankin and Project Manager C. B. Cansler had run into the problem of how to sift clay lumps out of a sand dune, and solved it by digging around the clay deposits.

Local traffic had used the finished surface for several weeks without showing up any weaknesses in the pavement.

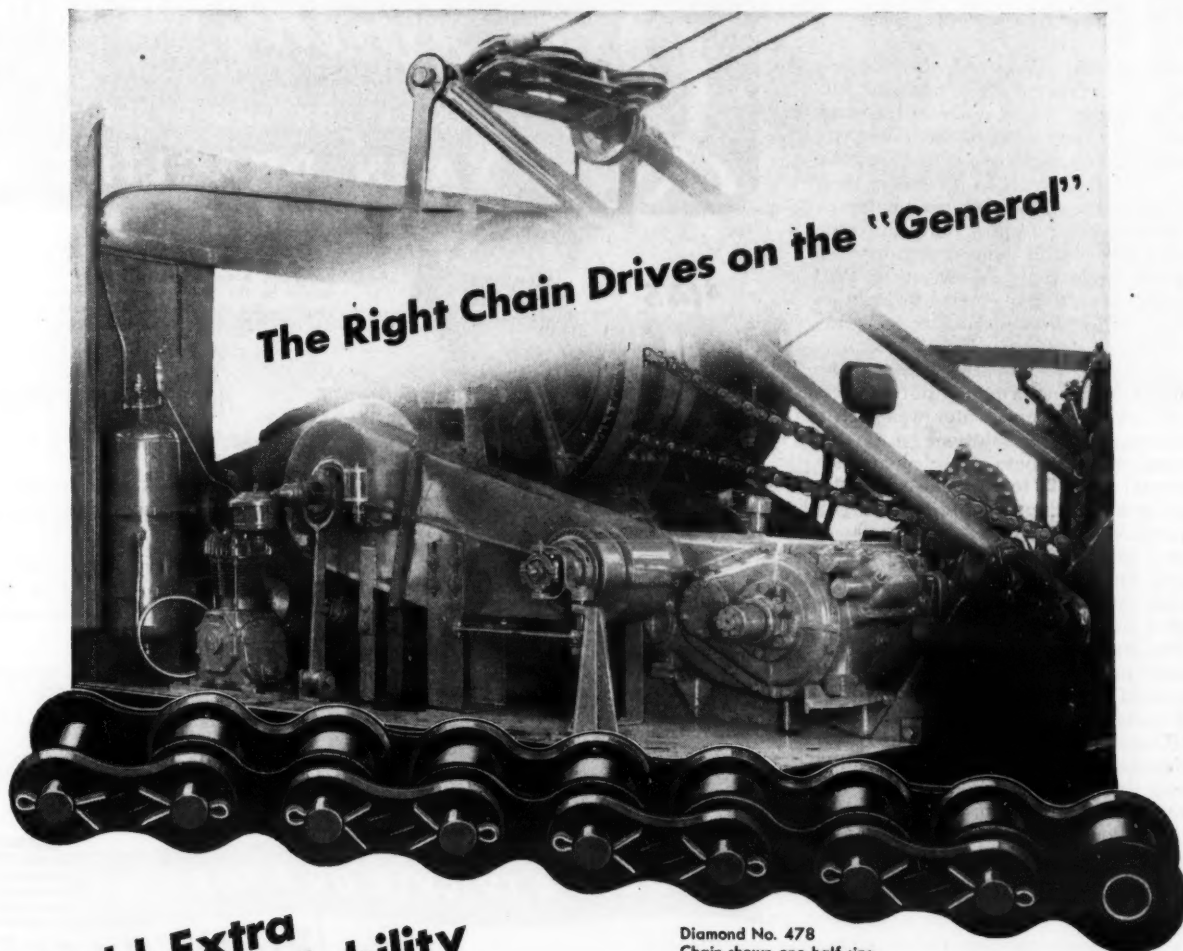
It remains for time to tell exactly how successful this experiment is going to be, of course. But the State and the Public Roads Administration personnel, as well as county engineers, are watching this job with interest.

Tricky Foundation

The new road runs through virgin sand-dune country part way, and passes through an irrigated agricultural section in low ground. While you might not expect to find water on the Great American Desert, it turned out to be one of the bad engineering problems of the job. Clogged drainage ditches in irrigation systems, combined with elevated but unlined earth canals, caused the water table near the center of the job to rise within 5 inches of the ground surface.

Once-fertile fields became coated with alkali. Crops perished. Alfalfa

(Continued on next page)



Add Extra Dependability

Ease of operation, adaptability and high output are important characteristics of the Model 105. Like other General Excavators, this nimble, one-man

Diamond No. 478
Chain shown one-half size

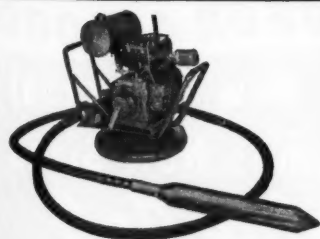
operated, rubber-mounted machine has drives in keeping with other superior details of design and construction—DIAMOND Roller Chain Drives.

On the engine and "crowd" drives, these widely preferred chains provide positive and sure means of transferring all the power all the time. DIAMOND Chains are known to machinery builder and user for their retained high efficiency (98-99%), inherent elasticity, and extreme durability that aid in profitable performance.

Practical assistance, when considering model changes or new machines, is available to help save you time. DIAMOND CHAIN COMPANY, Inc., Dept. 487, 402 Kentucky Avenue, Indianapolis 7, Ind. Offices and Distributors in All Principal Cities.



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ELKHART INDIANA



C. & E. M. Photo
This Wisconsin-engine-driven CMC pump supplied water from an irrigation canal for processing embankment sand on the White Co. contract.

Road-Mixed Base

(Continued from preceding page)

withered and died. At the Arizona State Experimental Farm near-by, tilling equipment mired down in the sand. With mere discussion of the water rise practically forbidden in the vicinity, the road builders had to build their highway across the soggy foundation.

A cut section 5 miles south of Yuma and a native sand dune near Somerton were designated as borrow pits. A P&H 1½-cubic-yard shovel was brought in with a 6-unit fleet of 5-cubic-yard International dump trucks. These machines began to haul the sand for the embankment, and promptly mired down.

Where the ground water was such a problem, the only solution was to increase the thickness of selected base material from 15 to 18 inches. Enough sand was end-dumped and bladed by a Caterpillar-D7-mounted bulldozer to give a bearing to the trucks. The extreme thickness of this base was 18 inches over boggy ground; not more than 6 inches in many other locations.

The contractor had considerable difficulty in getting high densities. With the sand so high in fines, water would not penetrate. Two 3-inch pumps, a CMC and a Rex, had been set up by an irrigation canal, and two 2,300-gallon water tanks on International trucks provided. Later a Ford truck with a 1,150-gallon tank was brought in. But all the watering equipment in the world was not successful until they began to process the sand in lifts not thicker than 2 inches.

A Caterpillar No. 12 motor grader spread the sand to that thickness, the water-tank trucks then gave it a heavy shot of water, and three pneumatic-tire rollers worked the embankments down to good densities. Thin lifts, heavy watering, and constant pneumatic rolling comprised the only technique that would give the desired results.

The embankments were built up to plan elevation, as staked by Arizona Highway Department surveyors. Cut sections were removed. The embankment was finished first from the Somerton end.

Where sections of the old county highway were already oiled, the design incorporated them as much as possible to coincide with the top of fill. Nothing had to be done to this existing oil except to tack it with 0.1 gallon of RC-2 per square yard. In a few places this old oil had to be torn out, and over at least 50 per cent of the job a new embankment had to be built on top of the old road.

Preparation for Road-Mix

Specifications for selected base were the same as for mineral aggregate in the road-mix. They provided for "a select native material having no clay

balls, a plasticity index of not more than 5, and fine particles passing the 200-mesh sieve not to exceed 20 per cent." Specifications also called for any rock larger in dimension than the thickness of the lift to be worked down into the base of embankments.

About a mile of base was made ready for the first test of road-mixing. RC-2 cut-back asphalt was hauled in from the Petrol Corp. refineries near Los Angeles. It arrived at a temperature of from 150 to 160 degrees. The base surface was given a 0.5-gallon-per-square-yard shot of this oil with a pressure distributor on the trucks. The road was primed full width by making two passes with the 8-foot distributor bar, and then artificially widening it to 12 feet for one pass. A light blot coat was then dusted over this fresh oil, and traffic allowed to pass.

This prime coat was applied immediately prior to laying down road-mix material. After about half the road-mixed cake had been laid, the sealing



C. & E. M. Photo
Selected mineral aggregate, composed of native Arizona dune sand, was dumped in windrows preliminary to road-mixing, with enough space left for local traffic to pass.

of embankment had not worked out well enough to continue. So for the balance of the job, the only sections to receive the prime coat were those where existing oil was exposed. Here

the tack was 0.1 gallon per square yard.

Road-Mixing Methods

Mineral aggregate was trucked in by
(Continued on next page)

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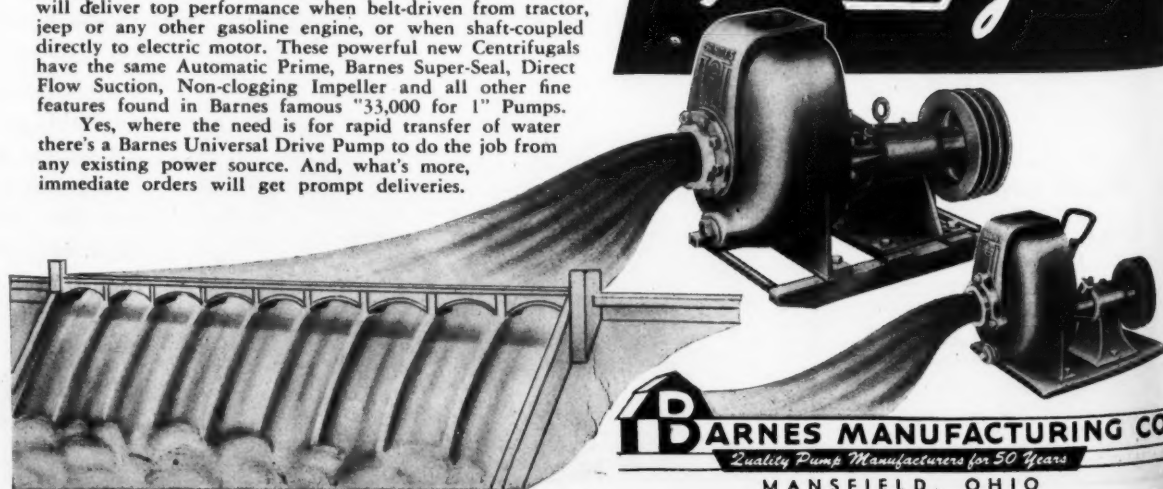
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Road-Mixed Base

(Continued from preceding page)

the Internationals, hauling from the P&H shovel. All mineral aggregate, as well as base-course material, was carefully weighed on a set of Winslow motor-truck scales. Weights were recorded and a mixing sheet made to guarantee the right amount of bitumen later on. The sand was dumped in two windrows, one on each side of the road embankment near the shoulders. This left enough space for local traffic to pass between the windrows.

The windrows measured approximately 30 inches high and about 5 feet wide at the base, and their volumetric content was precisely calculated. That figure ran 0.758 cubic yard per linear foot for both windrows; half that much for each. The bitumen content was calculated at 2.71 gallons per linear foot on each windrow, giving 4.2 per cent of RC-2 asphalt to the mix.

The bitumen content was purposely calculated on the low side because of the excessive summer temperatures near Yuma. They cause over-asphalted roads to bleed. Summer temperatures are always taken 50 feet off the ground—never down on the highways where an egg will fry—but even so, readings in excess of 120 degrees are frequent.

A Gardner road mixer was brought in from Redlands, Calif. It was set in place at the start of the first windrow, and an asphalt transport truck hooked up. Basically the Gardner road mixer is a pugmill mounted on a Caterpillar motor grader. It is a self-propelled machine that will walk to work.

Each windrow was processed separately, and finished before moving to the next. All the oil was put in when the Gardner mixer made its first pass. The machine turned right around at the end of the first stretch and made another trip. A Caterpillar No. 12 motor grader following this machine bladed the material back to its original windrow after each pass, for the Gardner mixer leaves a windrow flattened due to the thorough mix it gives.

In some cases two passes with the Gardner were enough. But in stubborn cases where free oil still showed on the particles, or where uncoated particles could be seen, a third pass was made. No more than three passes were required.

Beautiful weather through December in this heart of America's sun bowl helped to keep dry sand in the two windrows, and generally helped the work.

The road-mixed windrows were left two days to aerate. After two days the Caterpillar No. 12 grader gave each windrow a complete turn towards the center line of the road, hastening the aeration process and leaving the road open next to the shoulders for traffic to use.

After a week the first section was cut in for laying. The two windrows were bladed together by a No. 12 Caterpillar, on the theory that this blending would get rid of any possible differences in

material. The material was then bladed over all the roadway in $\frac{1}{2}$ to $\frac{3}{4}$ -inch layers, and thoroughly rolled all the while by two pneumatic-tire rollers.

When the last lift had been placed and rolled, a Buffalo-Springfield 8-ton roller was put to work. It rolled the material until it would no longer show

any signs of springing.

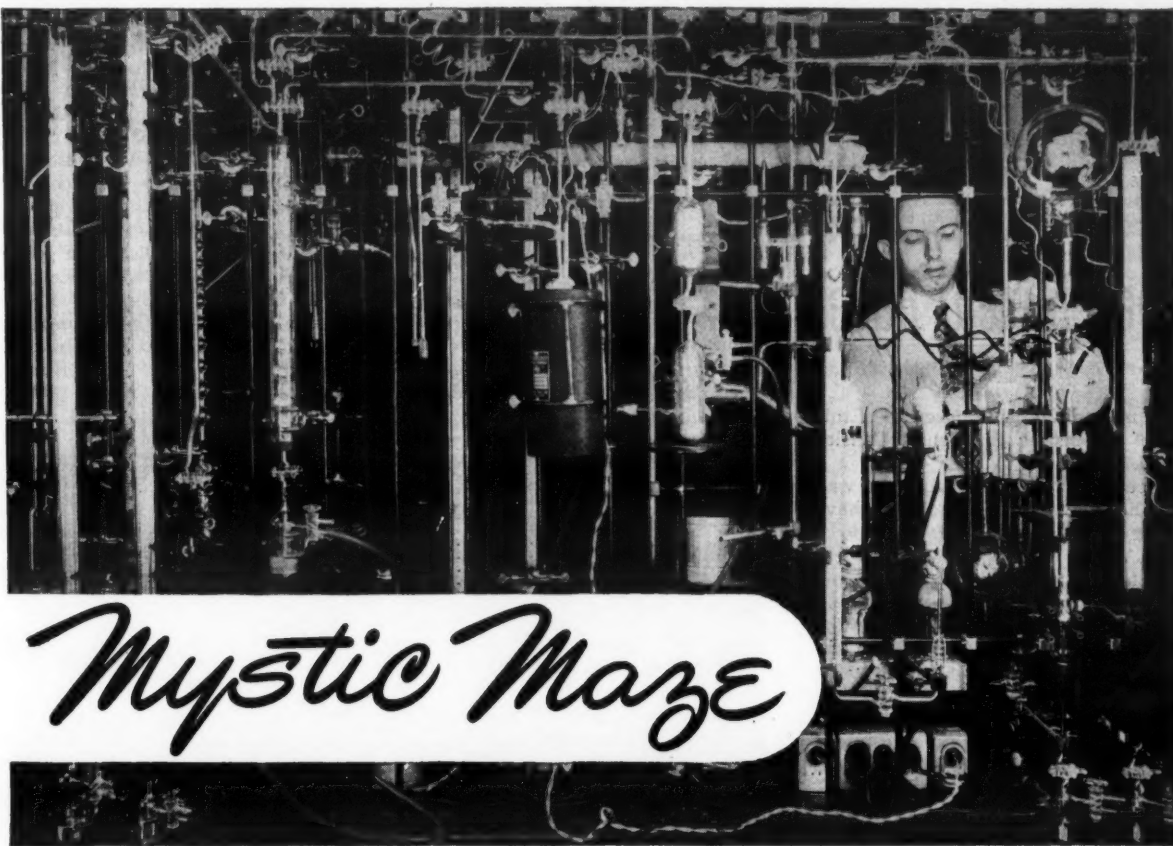
Trouble

Ten days later great cracks appeared in many places.

That moment was one of the most discouraging on the job. A Public Roads Administration man said later,

"You can expect those things to happen with RC-2". But that day there was nothing for Resident Engineer Jim Rankin to say to Superintendent Cansler but, "It looks as if we're going to have to tear it up, Carl!"

With the extremely fine cooperation
(Concluded on next page)



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C. & E. M. Photo
Left to right are Resident Engineer J. B. Rankin, Project Manager C. B. Cansler, and Superintendent Ray Shupe who worked together on the White Co. experimental low-cost road job between Yuma and Somerton, Ariz.

Road-Mixed Base

(Continued from preceding page)

which makes it possible to write of this highly important incident, Cansler agreed.

"It sure isn't worth a damn the way it is," he said. "If we're going to have to tear it up, we'd just as well do it now!"

So that first section was ripped up, remixed with no further asphalt, and relaid. It gave the first real clue to the peculiar behavior of RC-2, for the proper time of aeration was much longer than expected.

"We thought it would crust up in no time at all, but that first bad piece taught us a lesson," Rankin laughed. "We found that a ten-day period of aeration was about right for the material under these conditions. And when we tore that first piece up and put it down again, it went in better and has turned out since to be free of cracks. It is one of the best sections we've laid."

After the rolled material had carried traffic for about a month, aerating further all the while, a light Type B seal coat was applied. This consisted of 0.5 gallon of emulsified asphalt per square yard, applied by pressure distributor, and screenings at the rate of 25 pounds per square yard. The screenings were rolled, after being applied by a Buckeye chip spreader, with the 8-ton smooth roller, and excess chips were swept clear by a Grace power broom.

Specifications on wearings chips are

given in the following table:

Size Sieve	Per Cent Passing
3/4	100
No. 3	70-100
No. 10	0-10
No. 200	0-2

This seal coat gives an excellent

wearing surface with riding qualities much smoother than the road-mix. It also serves as a roof over the road, to keep excess top water from seeping through into the selected base.

When the job was visited, it was planned to give a fine mist coat of hot RC-2 to the road-mix before applying the seal coat. None of this had been done, but it was expected that as near 0.1 gallon per square yard as possible would be applied.

Job Personnel

Marcel Forman, Highway Commissioner from Yuma, is of course actively interested in this job. W. C. LeFebvre is the State Highway Engineer, with R. C. "Smilin' Cy" Perkins as his Chief Deputy. The job was directed by James A. Parker, District Engineer, with J. B. Rankin as Resident Engineer.

C. B. Cansler was the Project Manager for the L. M. White Contracting Co., with Ray Shupe as Superintendent and John Carey as Paving Superintendent.

This highly important traffic link between Yuma and the irrigated farms towards the south will have to bear some heavy traffic loads in the months to come. It has cost less than \$20,000 per mile under the American contract system. If it points up the lessons it promises to—and which everyone in this southwest region hopes it will—it will justify its building a hundred times over. For there is a very great deal of fine sand in America's southwestern desert!

Eutectic Distributor Plan

A new policy of local distribution has been inaugurated by the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. Authorized distributors are being appointed to handle the line of welding rods and fluxes. Territories are open for established supply dealers, each of whom will receive the assistance of the company's local field engineers in merchandising the line and in handling consumer problems.

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ACCURATE CONTROL—Volume of oil is mechanically synchronized to the speed of the Road Pug and adjusted to volume of windrow by the Madsen-patented volume metering pump.

A SINGLE UNIT—A complete machine for producing road mix; no elevators or feeders and no extra attachments required except an oil-supply tank trailer.

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FASTER because the Madsen Road Pug, a single complete unit, picks up and dry mixes the aggregate...spray injects a *pre-determined amount* of binder...cross mixes the material...and discharges a uniform mixture of dependable quality. **BETTER** because the ratio of aggregate and oil are accurately controlled.

AT LOWER COST because the Madsen Road Pug will produce from 200 to 550 tons per hour, pumping 9000 to 12,000 gallons of road oil while travel-mixing at a speed of 5 to 40 feet per minute. There are no delays because oil tank trucks hitch-on and replenish the oil supply while the Road Pug operates.

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Contractors Turn On Heat to Lay Runway

Summer Heat Simulated For Runway Penetration Aggregates by Using an Asphalt-Plant Drier

HOW two contractors turned on the heat in more ways than one, beating Old Man Winter on a bituminous penetration runway, was recently a subject for discussion in the Fort Worth Office of the Civil Aeronautics Administration.

By using a standard asphalt-plant drier to pre-heat rock aggregates, Capital Construction Co. and B. W. Loper of Santa Fe, N. Mex., squeezed through to finish the new 5,000 x 100-foot east-west runway at Raton Municipal Airport. The work was a part of their \$190,563 contract with the CAA for improvements and additions to the New Mexico field. With winter closing in, the contractors desperately wished to finish the penetration surfacing in time to meet the February, 1947, deadline for completion.

The new east-west runway was the major part of the project. But other important parts of the contract consisted of the same penetration-type repairs to existing north-south and northeast-southwest runways. All penetration surfacing rests on a 13-inch flexible base course, consisting of crushed limestone mixed with water by a Barber-Greene traveling mixer.

Base-Course Methods

The crushed-aggregate base course was produced in a pit near the airport to meet the following tolerances:

Size Sieve	Per Cent Passing
2-inch	100
1½-inch	70-95
1-inch	55-85
¾-inch	50-80
No. 4	30-55
No. 40	10-25
No. 200	3-10

Crushed aggregate was hauled to the airport runway sites, dumped by a fleet of 5-cubic-yard dump trucks, and windrowed by motor graders. Windrows were so prepared that they could be mixed thoroughly by a Barber-Greene traveling plant, and the material cut out in layers from 2½ to 4½ inches thick.

The lifts of flexible base were laid starting at the center line of runway, working outward. Each lift was thoroughly rolled by sheepfoot, pneumatic-tire, and flat-wheel rollers to 95 per cent of ultimate density or better. Most of this work was done through the summer of 1946 in hot weather.

Finished flexible base was primed with MC-1 asphalt at the rate of 0.3 gallon per square yard. Asphalt was applied at a temperature of 160 degrees by an Etnyre asphalt distributor. In general, stretches of runway at least 1,200 feet long were primed in advance of any penetration treatment.

While a great deal of this work was done through the summer, progress on the job was not all that the contractors had hoped for. Autumn came, and with it intermittent rain and much colder

weather. In an effort to beat the time clause, the contractors suggested the use of an asphalt-plant drier to simulate summer heat so far as penetration aggregates were concerned. Permission to try this scheme was granted by the Civil Aeronautics Administration.

Penetration Treatment

A Barber-Greene oil-fired drier was installed to heat aggregates. The CAA had stipulated certain rules governing the permission it had granted. Asphalt could be applied when the air temperature was 35 degrees and rising, but it would not permit any penetration treatment when the air temperature was 40 degrees and falling.

The method of placing penetration surfacing was the same as it had been



CAA Photo
Crushed aggregate for runway base course at Raton Airport, N. Mex., was windrowed by motor graders. Windrows were so prepared that they could be mixed thoroughly by a Barber-Greene traveling plant, and the material cut out in 2½ to 4½-inch-thick layers.

throughout the summer, except for the fact that the drier was being used. Penetration surfacing was applied in three courses, as follows:

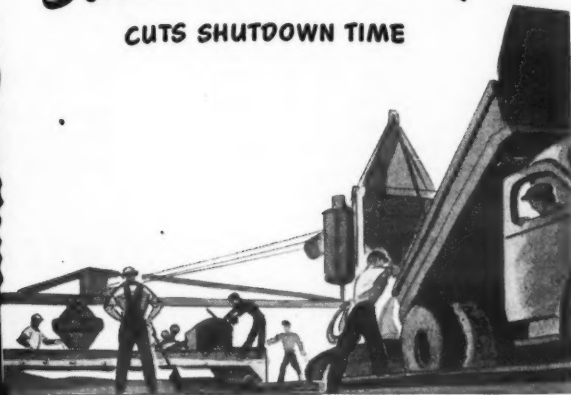
First Course: The primed flexible base was treated with 0.30 gallon of 275-penetration asphalt cement per square yard, applied by an Etnyre dis-

tributor at an average temperature of 350 degrees F. Following immediately behind the distributor came a Buckeye spreader, which fed crushed-rock aggregates on the hot asphalt at a rate of 40 pounds per square yard. Trucks hauling aggregate backed in over the

(Concluded on next page)



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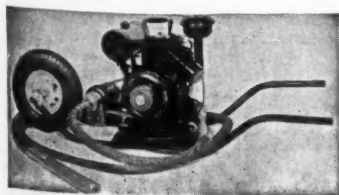


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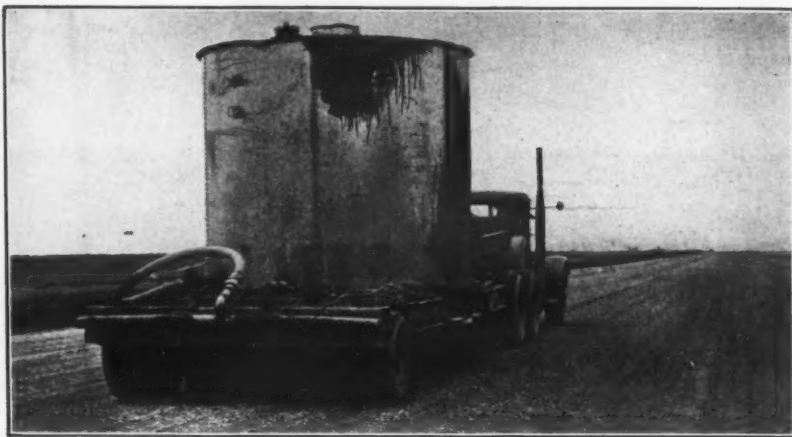
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CAA Photo

This pneumatic-tire roller was used by Capital Construction Co. and E. W. Loper, contractors, to secure compaction on runway base course and penetration surfacing at Raton Airport. The tank on the roller contains 2,400 gallons of water.

Contractors Turn On Heat to Lay Runway

(Continued from preceding page)

rock course already dumped to discharge to the spreader. Dumping in this manner insured an even distribution of rock aggregate over the hot liquid asphalt.

The first course was then rolled by a pneumatic roller until most of the particles were well bedded and the asphalt had taken on its initial hardening. The layer was then broomed with a drag broom, and flat-wheel-rolled by a 5-ton tandem steel-wheel roller.

Gradation of aggregate for the first course was as follows:

Size Sieve	Per Cent Passing
1-inch	100
3/4-inch	90-100
3/8-inch	20-55
No. 4	0-10

Second Course: The second course was not applied until the entire runway, or whole repair sections in the other two runways, had been completely finished with the first course. Second-course penetration consisted of a 0.45-gallon-per-square-yard shot of 275-penetration asphalt cement, applied at the same temperature by the same distributor as was used on the initial course. Rock aggregate of the same dimension as that in the first course was laid down by the Buckeye spreader at the same rate of 40 pounds per square yard. The same rolling and brooming technique was used on this second course as had been previously used on the first course.

Third Course: The third and final penetration course consisted of a thinner layer of a somewhat finer-screened aggregate, bound together by a 0.30-gallon-per-square-yard application of 275-penetration asphalt. After the asphalt had been applied, the Buckeye spreader laid down 23 pounds of aggregate per square yard, which was rolled and broomed as the first treatment had been. Screen gradation of the final course was as follows:

Size Sieve	Per Cent Passing
1/2-inch	100
3/4-inch	90-100
No. 4	0-25
No. 8	0-5

By operating the oil-fired drier at capacity, the contractors were able to lay 20,000 square yards of single-lift penetration work per 9-hour day, and the job was completed on February 16. Just in time, for one week later Raton was snowbound.

Personnel

The Raton Airport was designed by the Fort Worth Office of the Civil Aeronautics Administration and supervised under the direction of Regional Administrator L. C. Elliott. C. G. O'Fiel is Superintendent of Plant and Structures for the Fort Worth Office, and E.

L. Marek was the Resident Engineer in the field. Contractors' operations were directed by B. W. Loper.

The finished airport will accommodate all types of transient aircraft which now regularly use Raton Pass as a flyway through the high Rocky Mountains.

Signs on Expressway Have Safety Design

Route markers designed for rapid reading will be installed by the New Jersey State Highway Department on its Elizabeth-Newark Route 25 (U. S. 1-9-22), now being modernized and widened for 3 miles into eight lanes of four 32-foot roadways.

The new direction signs will have letters 15 inches high and direction arrows 4 feet long. The letters and arrows will be outlined with white neon tubing which will be recessed in the letter channels for increased day and night visibility. The tubing will be lit continuously, and it is estimated that the signs will be visible at least 750 feet. Sign bridges are being used as an ex-

tra means of clear identification. These structures will be made of overhead steel beams across the roadway, holding route numbers and municipal names directly over the lanes for various destinations. Five bridges will be used. The longest span will be 80 feet, and the others will vary in accordance with the width of roadway and the importance of the road junction. The largest of the signs will be 24 feet wide, and smaller ones will be on posts at the roadside. In all, there will be about 70 road markers on the 3-mile link, and 27 will be illuminated.

Summers Joins Kotal Sales

The addition to its sales force of Arthur B. Summers of White Plains, N. Y., has been announced by the Kotal Co. of Summit, N. J., maker of bituminous admixtures. During the war, Mr. Summers managed the subcontract department of General Electronics Industries, Greenwich, Conn.



FOOTE Kinetic mixer

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Now it is possible to do all sorts of small asphalt jobs—at a profit—with the Foote Kinetic Mixer! You take the asphalt plant to the job... mix fast and thoroughly... get high asphalt output with a low equipment investment. For the first time, contractors with limited capital can share in the profitable jobs requiring quantities of asphalt that cannot be prepared economically in a regular plant. Write for details on the new Foote Kinetic Mixer—and the entirely new mixing principle that makes it possible.

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With the new diesel engines developed by Caterpillar, the No. 12 motor grader develops 100 hp. It also features 100 per cent constant-mesh transmission, six forward speeds, and electric starting for the gasoline starting engine.

New-Design Diesels Speed Earth-Moving

Two new diesel engines developed by the Caterpillar Tractor Co., Peoria 8, Ill., have made possible increased efficiency in its No. 12 and No. 112 motor graders and its D6 and D4 track-type tractors. Refinements of the new 4-cylinder D315 and the 6-cylinder D318 include: a 1/4-inch increase in bore, a heavier stronger crankshaft with 36 per cent larger journals (cross-sectional area), and 30 per cent larger crank-pin bearings.

Individual inlet and outlet manifolds positioned on opposite sides of the cylinder head are designed to allow freer flow through intake and exhaust manifolds. The oil-pressure system is said to maintain proper oil pressures at the bearings even in extreme cold-weather starting. Larger valves and high valve lifts contribute to fuel economy, the company points out, while the fuel-injection valve design permits easier servicing. The pressure-operated valve mechanism is enclosed in a copper capsule, replaceable as a unit, with no overflow lines required.

The use of these engines gives 100 hp to the No. 12 and 70 hp to the No. 112 motor graders. Other improvements include a 100 per cent constant-mesh transmission, power-operated mechanical controls with brakes which are designed to prevent creeping or coasting under load, and an arched front axle for maximum clearance. The No. 12 is equipped with electric starting for the gasoline starting engine as standard equipment, and this feature is available for use on the No. 112 where desired.

The new D4 tractor will develop 43 drawbar hp, and the D6 will develop 65 drawbar hp.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 37.

Protective Coating For Ferrous Metals

A new anti-corrosive coating has recently been put on the market by the Industrial Metal Protective, Inc., Dayton, Ohio. Known as Zincilate, it is said to afford 20-year protection to ferrous metals against all common corrosive forces.

It has been used on pipe lines, interiors and exteriors of water and gasoline tanks, bridges, machine parts, and on marine installations. The manufacturer states that laboratory tests have shown it to be unaffected by 1,000 hours of exposure in standard salt-fog corrosion equipment. Zincilate is a one-coat protective coating, which the company claims will give protection even after scraping or wear, due to the cathodic sacrifice of the film.

Initial producer of the product is the Industrial Metal Protective Corp. of Virginia at Newport News, Va. Fundamental research, laboratory development, and management services were conducted by The Commonwealth En-

gineering Co. of Ohio, located in Dayton.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 7.

Six Testing Machines Added by Laboratory

Six new testing machines have been added to the facilities of the Pittsburgh Testing Laboratory at Stevenson and Locust Sts., Pittsburgh, Pa. They are of the Baldwin-Tate-Emery universal-testing high-column type, hydraulically operated, and are made by the Baldwin-Southwark Division, The Baldwin Locomotive Works, Philadelphia, Pa.

These machines will be used primarily for tension and compression tests on metals, concrete, concrete pipe, highway guards, jacks, roof slabs, springs, and special assemblies. Five of them are of 300,000-pound capacity, and the other is of the 200,000-pound type. They have a 12-inch stroke for testing materials to failure.

Names Branded on Tools

A line of branding irons and related equipment for placing positive identification on contractors' tools is described in a folder issued by the Everhot Mfg. Co., Flothow and St. Charles Sts., Maywood, Ill. Equipment described includes stamps for concrete pavement, tool kits of steel, torches, numbering disks for grade stakes, etc. The folder gives com-

plete details, prices, and instructions on the use of the equipment.

The Everhot branding iron is said to attain the proper temperature in from 5 to 7 minutes; branding letters are standard Gothic up to 2-inch size. The tool may also be used as a soldering iron or blow torch.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 71.

MARVEL

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UNITED STATES RUBBER COMPANY

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CONVENTIONAL AIR HOSE is seldom discarded because it is worn out. Failure usually occurs from rupture of the cotton carcass, breaks near the coupling, or the action of hot oil vapors on the rubber linings.

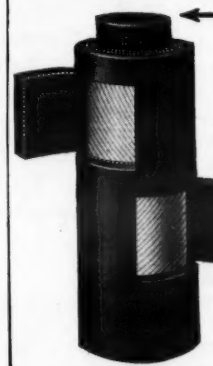
But you'll find a different story in the different construction of U. S. Royal Cord Air and U. S. Peerless Compressor Hose.

In both, every cord in each pressure-resistant ply is cushioned in rubber, for protection against bruising. No cord criss-crosses another, consequently no shearing action occurs during pulsation, expansion, and flexing. The high flexibility of "U. S." Hose with the unique cord construction keeps down recoupling jobs.

When compressors throw oil vapors into the lines, U. S. Peerless Compressor Hose is tops... has special synthetic rubber lining that cannot be harmed by oil vapors.

Available at your equipment dealer or the nearest branch of United States Rubber Company.

The Unique U. S. ROYAL CORD CONSTRUCTION



Rubber tube compounded for air conditions.

All cords in pressure-resistant plies parallel each other in a cushion of rubber, for protection against bruising. No shearing is possible under expansion, contraction, and flexing.

Tough, thick, wear-resistant cover.

IF HOT OIL VAPORS ARE PRESENT, use Peerless Compressor Hose. Same cord construction with special synthetic rubber lining oil cannot ruin.



U. S. ENGINEERED RUBBER PRODUCTS FOR THE CONTRACTOR

Air, Water, Steam, Suction Hose • Belts • Packings

Secondary-Road Work Scores Good Progress

Report to County Division of ARBA Indicates That Most of Federal-Aid Funds for County Roads Is Obligated; Federal-State-County Cooperation

IN no other major field of highway activity is teamwork more important than in Federal-Aid secondary-road construction. So H. E. Hiltz, Deputy Commissioner of the Public Roads Administration, reminded members of the American Road Builders' Association County Officials Division recently. The development of more skillful county engineering organizations is being encouraged by many of the state highway departments and by the Public Roads Administration in this cooperative plan for improving secondary routes under the terms of the 1944 Federal-Aid Highway Act. And during 1946, in spite of many handicaps, real progress was made, Mr. Hiltz said, thanks to such all-around teamwork.

1946 Advance

The year 1946 brought many unanticipated difficulties to the highway program. But in spite of shortages, labor-management difficulties, and other handicaps, the overall accomplishments are encouraging. Of the \$300,000,000 of Federal and matching funds for Federal-Aid secondary-road construction made available for 1946, 90 per cent had already been obligated to specific projects by January, 1947. And, in accordance with the present law, there were five months remaining in which to commit the balance. In addition, more than one-third of the \$300,000,000 for 1947 had been committed to definite projects, with a year and a half left to commit the balance.

Contracts already awarded amounted to \$134,000,000; this sum is equal to almost one-half of the annual funds available for secondary roads under the program.

Status of Secondary Roads

On January 1, 1946, only 80,000 miles of Federal-Aid secondary routes were included in the Federal-Aid secondary system established under the terms of the new legislation. But by the first of January, 1947, through the cooperative efforts of the states, counties, and the Public Roads Administration, this was increased to 324,000 miles, or more than four times as much as had been selected the year before. This mileage exceeds by 90,000 miles the length of the 25-year-old Federal-Aid primary system.

This accomplishment involved setting a pattern for (1) careful consideration of the relative importance of various routes from a transportation standpoint, and (2) equitable distribution of the system among the counties. Most states have developed formulae for the geographical distribution of the system's mileage. These formulae reflect consideration of various economic factors, such as area, rural population, vehicle-miles of travel on all or parts of the rural roads, rural-road mileage, vehicle registration, property valuation, value of farm products, and the number of farms.

Formulae similar to those used for distribution of system mileage are used in 26 states for distribution of funds. In 3 states, equal distribution of funds is made to all counties. In 19 states, improvement requirements, availability of county funds, and other similar factors control the distribution of funds, rather than any formula.

County Activities

In setting up the Federal-Aid secondary-road system, the counties made the

initial selections of county roads in 17 states. In 9 states, they undertook the initial job jointly with the state highway departments. In 16 states, they reviewed and reported their reactions to the initial selection of county roads proposed by the state highway departments. Of the remaining 6 states, 5 do not have county highway systems.

In 17 states, counties are providing varying proportions of matching funds. That these contributions are substantial is evidenced by the fact that they reached a total of \$30,000,000 or 23 per cent of the 1946 funds used by all states to match the Federal money.

There are 900 counties in 24 states which have participated in engineering. All 900 make surveys and plans, and 500 of them also prepare specifications and

estimates. Actual construction is performed almost everywhere by contract, with a small amount of work being done by county forces.

Outlook for Future

Mr. Hiltz looks forward with optimism to the future of this program. He anticipates that the cooperation between counties, states, and the Public Roads Administration will increase. He anticipates that these three agencies will be able to reinforce their ranks of technical personnel and increase their capacity for carrying forward the program. He anticipates that all of the 1946 and 1947 funds for Federal-Aid secondary routes can be committed to specific projects promptly.

For the successful accomplishment of

the Federal-Aid secondary-road program, Mr. Hiltz pointed out, the construction industry must maintain and increase its skilled organizations. It must bid on work at reasonable prices in accordance with our competitive free-enterprise system. It should be our purpose, he said, to proceed with the program in accordance with sound engineering and business practices.

Northwest Moves Offices

The removal of its executive and sales offices to new and larger quarters has been announced by the Northwest Engineering Co., maker of shovels, cranes, draglines, and Pullshovels. The new offices are located in the Field Bldg., 135 So. LaSalle St., Chicago 3, Ill.

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To clear land, cutting out trees at their roots . . . or to move hot slag from an open hearth furnace for a fill . . . these are run of the mill jobs for 'dozer-equipped International Diesel Crawlers.

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Excavate, remove overburden from ore deposits, cut through hills or ridges and build

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WHEEL TRACTORS

INTERNATIONAL



Philippine Status For U.S. Contractors

American contractors can undertake construction work in the Philippines under the Rehabilitation Act of 1946 on an equal footing with Filipino contractors. This announcement is based on a recent opinion of the Philippine Secretary of Justice, and was made public by Thomas H. MacDonald, Commissioner of the Public Roads Administration, Federal Works Agency. Furthermore, American contractors engaged in work under the Act need not employ a registered Filipino engineer to be in complete charge of the work.

The Philippine Government has advised Frank C. Turner, Public Roads Administration Division Engineer in

the Philippines, that American contractors will be accepted as qualified for submitting bids on road and bridge construction under the Rehabilitation Act if they are considered qualified and acceptable in the United States by the Public Roads Administration.

The sum of \$10,000,000 has been allocated for highways in the fiscal year 1947 in the Philippine rehabilitation program. Eighteen construction projects have been approved so far, at a total estimated construction cost of \$4,285,500. Included in this approved program are four projects for high-type pavement construction, totaling 21 miles in length; and ten projects for 25 bridges ranging in span from 23 to 336 feet. The approved program also includes four force-account projects for

bituminous mat and seal, totaling 29 miles in length, which are already under way.

The first of the projects to be handled by contract was advertised for bids on March 20. It is expected that projects of large size or particular interest to American contractors will be announced in this country at the time they are advertised.

Wire-Rope Engineer Dies

The death of J. J. Wilson, at the age of 59, has been announced by John A. Roebling's Sons Co., Trenton, N. J. Mr. Wilson joined Roebling in 1920 in the capacity of wire-rope engineer, and at the time of his death was Seattle Branch Manager for the firm.

Laboratory Tests Highway Materials

Results Recorded on Card Index Covering Both Field Samples and Manufactured Goods Used in State Work

THE State Highway Department of New Hampshire tests all materials used in the construction and maintenance of its roads and bridges at a testing laboratory. This is located in the state highway garage on Stickney Avenue, Concord. Occupying six rooms in a wing of the garage, the laboratory includes an office, storeroom, moist room, and three other rooms known as the chemical, tar, and concrete laboratories.

The results of these tests are compiled and recorded on 5 x 8-inch cards which have a different color for each type or kind of material tested. The tar report, for instance, is colored orange, while a yellow card contains the results of tests on samples of petroleum or asphalt products. These analyses cover materials obtained in the field, such as sand or gravel; they also cover manufactured products such as cement, steel reinforcing bars, or concrete pipe.

Card Indexing System

The method of labeling all samples sent to the laboratory, and the system there of indexing the results of the tests on cards, provides a ready reference file. In this file, the complete history of a specimen can be read at a glance. Such ready reference holds for a sample sent in by the resident engineer on a construction job, which may be either a specimen of sand or gravel or a concrete cylinder. It holds equally well for a sample of cement from a lot that has just been shipped from a mill for use somewhere on a New Hampshire state contract.

In the latter instance the specimen is sent to the laboratory by E. L. Conwell & Co., Engineers, Chemists, and Inspectors of Philadelphia, Pa.; the company has a contract with the State to send such samples from any plant shipping cement to a highway job in the state. The cement samples are shipped in cans to the laboratory; the cement for the job is shipped in sealed cars directly from the plant, and the seal is broken only by the engineer or inspector on the project.

To each sample is tied an envelope tag with an eyelet hole. It has the address of the laboratory on one side, and a stamped form on the other with blanks to be filled in by the one submitting the sample, and a few lines to be marked at the laboratory. This type of tag is used so that any additional data can be written on a piece of paper and inserted in the envelope; thus all the information is kept in one place.

At the laboratory a sample is opened and given a number. Then the data on the tag are recorded on one of the varied-colored cards covering that type of material. This information is also entered in a permanent sample-record book in which the samples are numbered consecutively as received. Then the sample is ready for testing, according to standards of either the American Society for Testing Materials or the American Association of State Highway Officials.

The face of the colored card contains the report on the sample, whether it be tar; fine aggregate for use in concrete; gravel, stone, or bituminous mixtures; portland cement; petroleum or asphalt products; or miscellaneous. The information listed on this side includes the laboratory number; date of report and of the examination; name; sub-

(Continued on next page)

for Every Job

Diesel Crawlers

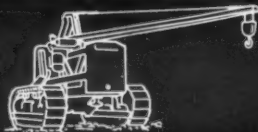
← Burnash Construction Company of Flint, Michigan, owns 10 International Diesel Crawlers and one gasoline wheel tractor. Freeman C. Burnash says: "The reasons I have only International equipment are: 1. The excellent service received from the distributor. 2. A lot faster machine. 3. Parts are more easily replaced as we don't have to take the whole machine apart to replace them. As long as this continues, our company will use only International equipment." The photograph on the opposite page shows one of the company's TD-14's working on a land clearing job for a housing project.

↑ In Cleveland W. E. Plechaty's two International TD-14 Diesel Crawlers saved time and cut costs of moving hot open-hearth slag to fill a 5-acre hole for a building site. 18 carloads are handled each day.

Tune in James Melton on "Harvest of Stars" every Sunday, NBC Network



Industrial Power



Highway Dept. Lab

(Continued from preceding page)

mitted by; report to; title; address; when the sample was taken and when received; the location from which it was taken; quantity represented; source of material; location used or to be used; and for whom it is examined. On the back of the card are the results of the test according to the kind of material of the sample. These 5 x 8-inch cards are filed in a steel cabinet containing 24 drawers into which they neatly fit.

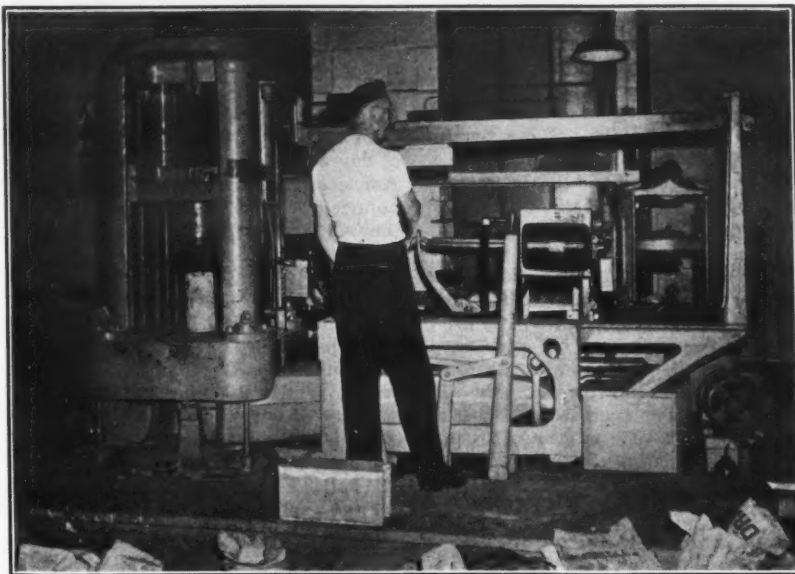
On completion of tests, the cards are sent to the main office where they are copied on similarly colored printed forms of letter-size, which are directed to the parties interested. The cards are then returned to the laboratory for filing.

An innovation is being tried to eliminate the inconvenience of having separate printed cards and report forms. This consists of an 8 x 10½-inch regular-weight report form so arranged that it may also be folded and serve as a laboratory card 8 x 5¼ inches for filing in the previously mentioned cabinets. The center fold carries printed code numbers that may be "signaled" for cross reference. The results have been so satisfactory that cards will be gradually eliminated.

For most convenient filing of the various matters pertaining to tests, equipment, research, periodicals, etc., a numerical index has been developed that allows the grouping of related materials together in the most logical order. A library of reference material is gradually being assembled and the index is also used in its classification and arrangement.

Concrete Laboratory

Most of the samples are received at the concrete laboratory, a 25-foot-square room which is the largest of the group. Here are performed the various tests on cement. These include the physical test for consistency, which is obtained on the Vicat apparatus with a 500-gram sample of cement mixed with water to form a ball. Gillmore needles are used to check the initial and final set of a patty made of cement and water, which is later cured in the moist room and given a steam-bath test to



C. & E. M. Photo
A technician at the New Hampshire Materials Testing Laboratory determines the compressive strength of a concrete cylinder in a Tinlus Olsen testing machine.

check for soundness.

The tensile strength of cement at 1, 3, 7, and 28 days is determined by making briquettes with a 1:3 mixture of 300 grams of cement and 900 grams of Ottawa sand. Distilled water is added to make a mortar, and the three are mixed for 1½ minutes before filling the moulds. The briquettes are cured in the moist room for the 7 and 28-day tests, and then broken on a Fairbanks shot machine where the weight required to effect the break is measured.

What catches the eye above all else in this room is the big Tinlus Olsen 300,000-pound mechanically loaded testing machine. It is used chiefly for determining the compressive strength of concrete mixes by crushing sample cylinders 6 inches in diameter x 12 inches high. This machine is also used for testing the tensile strength of reinforcing rods up to 1¼-inch diameter. A Riehle testing machine with a capacity of 50,000 pounds performs tests of a similar nature but on a smaller

(Concluded on next page)

ATKINS *Silver Steel* SAWS

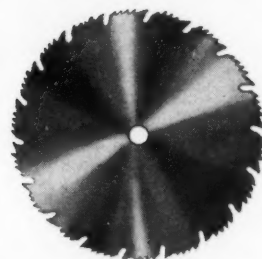
He'll do better—with better saws



1.



2.



3.

What a difference—when you equip your workers with Atkins Saws! Whether it's crosscuts for heavy-duty sawing... blades for power machines... handsaws for all-round work... with Atkins Saws your men will find the going easier and faster. Atkins Saws are correctly designed for their special purposes. And they're rugged... they'll come through the toughest test with flying colors. That famous "Silver Steel" builds extra stamina into Atkins Saws. It puts a sharper edge on the teeth, too—an edge that lasts. You'll notice less out-time for filing and setting.

Whatever kind of saw you need, Atkins has it. Atkins line of better saws includes chain saws, hacksaws and blades, coping saws, compass saws and many special types. They'll help your men do better work... boost your production... lower costs.

1. "Segment grinding" makes Atkins Crosscuts clear perfectly, eliminates pinching. Atkins No. 9 is one of a full line of "Silver Steel" Crosscuts.

2. Sawing's easier with this Atkins No. 65 Straight Back Handsaw—it has the improved "Perfection" handle. All types of handsaws available from Atkins.

3. Atkins No. 37 Mitre Tooth, one of a complete line of Atkins "Silver Steel" Circular Saws, is a combination rip, crosscut and mitre saw. Ideal for portable power saws and power tables.

E. C. ATKINS AND COMPANY

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50 Years' Experience

THE F. D. CUMMER & SON CO.

EAST 17th & EUCLID
CLEVELAND 15, OHIO

Highway Dept. Lab

(Continued from preceding page)

scale.

A non-highway function of the laboratory is the testing of coal burned in state institutions. For this test the coal is ground to a fine powder on a Braun coal-pulverizing machine. On one side of the room is a slate workbench where experiments are performed, and where a Fairbanks beam scale is located along with Tyler sieves. Off to the other side of this lab is a 12 x 12-foot storeroom where apparatus is kept if not in use.

Other equipment located in this section includes a Los Angeles Rattler for testing the abrasive-resisting qualities of coarse aggregate; a Tyler Ro-Tap machine for determining the sieve analysis of aggregates; an electric-driven concrete mixer which will mix a 1/2-bag batch for laboratory experiments; an International centrifuge used in such diverse tests as removing the pigments from paint, eliminating water from soils, or obtaining the sulphonation residue in tars; and a large Freas electric oven where sand and gravel may be dried or bituminous mixtures heated to any desired temperature.

Adjoining the concrete laboratory is a 12 x 18-foot moist room which has tile walls lined with a 2-inch layer of cork. For most of the work carried on in this room a constant temperature of 70 degrees is maintained by electric space heaters and a Servel refrigerating unit. Here the mortar briquettes and concrete cylinders are cured. A water spray maintains the humidity at nearly complete saturation.

Tar Laboratory

The 18 x 20-foot tar laboratory also adjoins the concrete lab. It is so called because New Hampshire is a great user of tar in its road work, having consumed 4,500,000 gallons during the last year in the nine divisions. The tar is purchased on the basis of measuring the volume of a shipment at 60 degrees F. But as tar is usually loaded into tank cars at 150 degrees F, the technicians compute the volume as it is received and make the necessary conversion to the standard of the Department. Most of the tar used during this past year was the T-5 grade.

The viscosity of the tar is checked on an Engler viscosimeter by first heating a 240-cc sample to 50 degrees C and then timing its flow through an orifice into a cylinder on a Standard Electric Time Co. clock. The time in seconds is divided by a factor previously obtained by using water for the test, and the result is the specific viscosity of the tar.

A 1,000-gm Dulin Rotarex with benzol as a solvent is used for removing the bitumen from bituminous mixes to determine the content of the tar or asphalt. A Wagner turbidimeter is kept in the tar laboratory for convenience, but its function is to determine the fineness of cement. By means of a photo-electric cell, it records the quantity of cement held in suspension when a sample is introduced and agitated in a tube of kerosene.

Chemical Laboratory

The tar room leads into a 13 x 22-foot chemical laboratory with slate-top worktables around the sides and down the center. Here are performed the chemical tests on all materials with a variety of apparatus and equipment including two viscosimeters, a Koppers and a Saybolt; an Emerson fuel calorimeter for determining the Btu's in fuels; three Eimer & Amend balances; an American electric stirrer; and, for heating or drying materials, a Freas electric oven and a Hoskins electric muffle furnace. An insulated Klondike icebox is used for keeping ice. In addition the worktables are equipped with

retorts, Bunsen burners, stills, etc., over which a hood conducts the fumes to the outside by means of an exhaust fan.

This laboratory leads into a 14-foot-square office in the front of the building. There the main records are filed and there the Materials Engineer has his headquarters. Outside the building is a shop-made piece of equipment on which a sample from any new lot of concrete pipe is tested for compressive strength by crushing it along the longitudinal axis, and recording the stress necessary to effect the breakage. The apparatus consists of a steel framework 12 feet high and 7 feet wide. It is supported on a concrete base on which the section of pipe to be tested is placed. A steel cross member is laid lengthwise over the pipe and secured firmly against lateral slipping. Another cross piece is placed slightly above the first, leaving only enough room for the insertion of a Blackhawk 40,000-pound jack. The top steel member is fastened to the side posts so that when the jack is worked

the pressure is directed against the pipe beneath. The force in pounds required to break the pipe is indicated on the jack.

Personnel

The personnel of the New Hampshire Materials Testing Laboratory includes three men, headed by Charles Benning, Materials Engineer. Frederic E. Everett is Commissioner of the State Highway

Department and D. H. Dickinson is Chief Engineer.

Credit Branch in S. C.

The Commercial Credit Corp. of Baltimore, Md., has announced the opening of a branch office in Sumter, S. C. This is part of an expansion program undertaken to aid buyers of goods with credit and installment financing.



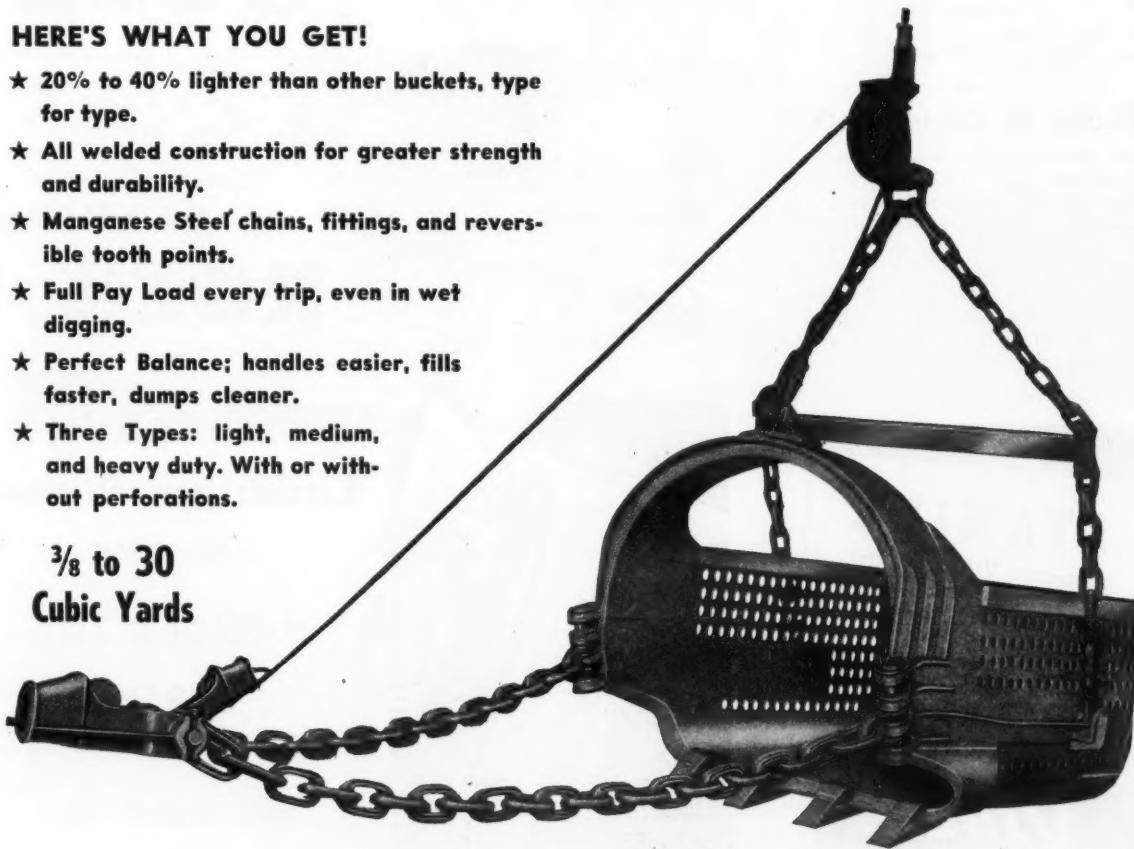
✓ CHECK THESE FEATURES FOR

Bigger Payloads!

HERE'S WHAT YOU GET!

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ All welded construction for greater strength and durability.
- ★ Manganese Steel chains, fittings, and reversible tooth points.
- ★ Full Pay Load every trip, even in wet digging.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.
- ★ Three Types: light, medium, and heavy duty. With or without perforations.

**3/8 to 30
Cubic Yards**



HENDRIX
Lightweight **DRAGLINE
BUCKETS**

Write for descriptive literature—or ask your dealer

HENDRIX MANUFACTURING COMPANY
MANSFIELD INCORPORATED LOUISIANA



For good visibility, the Kirby post-hole digger is made for right-hand-side mounting on wheel tractors. Shown here with manual controls, it is also made in hydraulic-control models. Four sizes of augers are available.

Post-Hole Diggers

Fit Wheel Tractors

A post-hole digger attachment which fits most wheel tractors is made by the Kirby Sales Co., Box 664, Hereford, Texas. It is made with either manual or hydraulic controls. Power is obtained through a V-belt attached to the tractor pulley.

The digger is mounted on the right-hand side of the tractor. It is said that the operator can run the tractor down a marked line, stopping on indicated marks for holes, without ever getting down from his seat and without the need of an assistant. A bumper attachment, making it possible to dig holes in an existing fence line, is standard equipment on all models.

Augers are available in 6, 7, 9, and 12-inch sizes. Each auger digs a hole one inch larger in diameter than its listed size. The electric-welded main framework of the digger is made of tubular steel, 8-inch channel iron, and 3/8-inch mild-steel plate. Approximate weight is 300 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 10.

Dealer for Central N. Y.

The formation of a new company for the sale and distribution of contractors' equipment and supplies has been announced by L. J. Ettinger, Jr., its President. Known as Highway Materials Co., Inc., of Groton, N. Y., it will handle the products of Cayuga Rock Salt Co.; Shunk Mfg. Co.; Baughman Mfg. Co., maker of cinder, lime, and coal bodies; Lane Pipe Co., maker of Gohi corru-

gated pipe; Tarrant Mfg. Co., Inc., maker of bituminous sprayers; and others. The company will cover 23 counties in central New York State.

In addition to sales and distributorship, the company also has developed some truck-unloading equipment to handle bulk salt. This consists of conveyors which bring the salt to the rear of the truck where portable conveyors elevate it into the customer's bin.

Bulk-Cement Mover Hauls 110 Barrels

A bulk-cement carrier capable of hauling from 100 to 110 barrels of dry cement has been announced by the Hercules Steel Products Co., Galion, Ohio. The carrier is designed to haul cement from mill to warehouse and from warehouse to the job.

Discharge time for a full load is four minutes, according to the manufacturer. The discharge door is at the rear end of the body. It is a circular rubber-gasket-



Discharge time for a full 110-barrel load of bulk cement from this trailer-mounted Hercules carrier is about four minutes. It features three manhole filler openings and an enclosed discharge chute.

fitted door operated by means of a threaded shaft, which is turned by a large handwheel to permit control of the discharge rate. The discharge chute is fully enclosed. Filling is accomplished through three manhole filler openings.

The power unit is a Wisconsin air-cooled gasoline engine of four cylinders. The carrier is mounted on a trailer.

Further information may be secured from the manufacturer, or by using the enclosed Request Card. Circle No. 12.



L-47
45-LB. GLASS DRILL
WITH 55-LB.
PERFORMANCE



Less Power To
DRILL MORE FOOTAGE
with

SULLIVAN

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**CADMIUM PLATED
ROCK DRILLS**

**Cadmium Plating
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LONGER LIFE

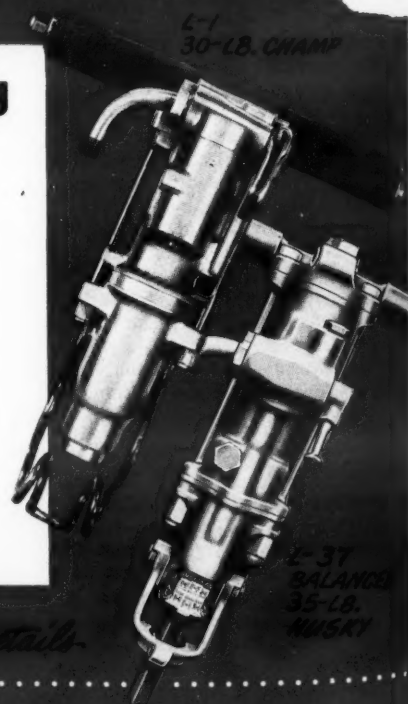
BETTER

LUBRICATION

NO RUSTING

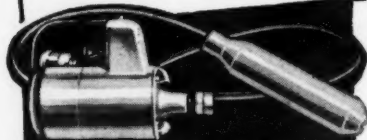
PREVENTION

OF RUCKING



STAMINA

Concrete Vibrators get tough treatment. VIBERS are built to "take it."



VIBER
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JOY MANUFACTURING COMPANY



The Model E Spreader, put out by the Highway Equipment Co., is designed to handle sand or cinders for ice control. It can also be used to spread calcium chloride, apply seal coats, or haul and spread crushed rock.

Unit Hauls, Spreads Variety of Materials

Speed, safety, and versatility are three of the claims made for its new highway spreader by the Highway Equipment Co., Inc., 616 D Ave., N. W., Cedar Rapids, Iowa. This new Model E is designed to spread sand or cinders for ice control.

The unit is built in all lengths to mount on any truck chassis, and power is obtained from the truck transmission by means of a power take-off. Thickness and width of spread are controlled from the driver's seat. Spread may be controlled to cover the full width of either two or four-lane highways in one operation, according to the manufacturer. Material is cast low, and ahead of the rear wheels in order to give extra traction for the truck.

In addition to ice-control work, the Model E can be used to spread calcium chloride or apply seal coats on oil. Also, by removing the distributor disk, the unit may be used to haul different types of material, including crushed rock, as well as to haul and spread chips and small rock for shoulder maintenance.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 3.

Diamond Wheel Has Special Resin Bond

A new addition to its line of abrasive wheels has been announced by Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J. It is a resin-bonded-diamond wheel for grinding carbides and carbide-tipped tools.

An exclusive feature claimed for this wheel is the special resin bond which has been developed not to load or glaze when it comes in contact with soft or hardened tool-steel shanks of carbide-tipped tools. The economy of this feature, according to the manufacturer, is realized in full wheel life through the elimination of the dressing or lapping usually necessary on wheels in order to clean the bond. Manhattan resin-bond-diamond wheels are said to be fast and cool-cutting on carbides.

A complete line of wheel types and shapes is available in grit sizes from 60 to 400.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 25.

Cummins Names Managers

The appointment of two regional managers has been announced by Cummins Engine Co., Inc., Columbus, Ind. The new Eastern Manager is Walter N. Westland and he will make his headquarters at 6303 Chrysler Bldg., New York, N. Y. The eastern territory includes New York, New Jersey, Pennsylvania, Maryland, and the five New England states.

The new Mid-Continent Manager, George W. Stevens, will make his headquarters at 1812 Fair Bldg., Fort Worth,

Texas. His territory covers the states of Texas, Oklahoma, and Louisiana.

Also announced at the same time is the appointment of Carmen Tenuta as Service Representative in the company's eastern region. Mr. Tenuta was former Service Manager of the Cummins Diesel Sales Corp. of Illinois, located at Chicago.

Photogrammetric Supplies

A line of equipment and accessories for photogrammetric surveys is described in a broadside now being distributed by the Abrams Instrument Corp., Lansing, Mich. Some of the items mentioned are radar recording cameras, split-image plotters, stereoscopes, laboratory timers, contact printers, mechanical triangulators, contour finders, electronic flash guns, intervalometers, and others. Instruction manuals are also available from the firm.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 26.

HOT or COLD Mix Asphalt



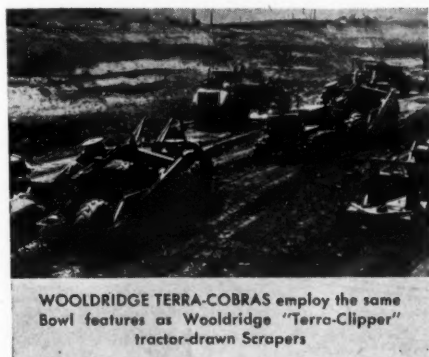
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-with a fleet of Wooldridge Terra-Cobras



WOOLDRIDGE TERRA-COBRA employ the same Bowl features as Wooldridge "Terra-Clipper" tractor-drawn Scrapers

Across 16.6 miles of North Dakota's rugged terrain, a new roadbed for the Northern Pacific Railway has been carved through lignite and hard vitrified scoria. A sizable portion of the 3,750,000 cubic yards of glacial deposit was handled by a fleet of nine Wooldridge high-speed, heavy-duty Terra-Cobras. These units were frequently given the toughest assignments in the hardest cuts. Compaction was effected by routing the heavily loaded units over varied portions of the haul road and fill. To keep your earth costs down to rock bottom, investigate Wooldridge Terra-Cobras, today.

Measure Each Job in terms of WOOLDRIDGE EQUIPMENT:

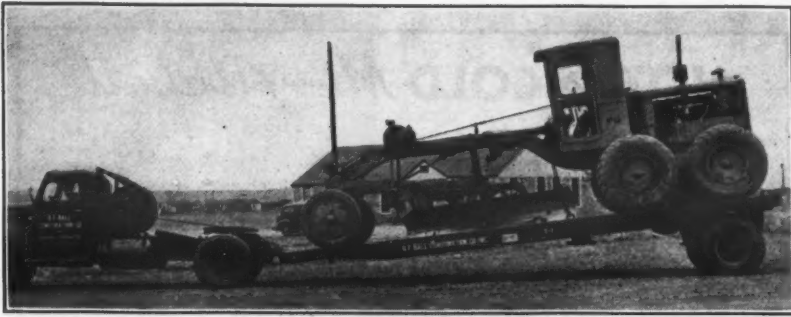
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TERRA COBRA

HIGH SPEED-SELF PROPELLED
EARTHMOVERS



One man can load the Hobbs tilting flat-bed trailer, its manufacturer says, by using a truck power winch to lower the trailer to ramp position and raise it again, loaded, to traveling position.

Tilt-Body Trailer Is Easily Loaded

A tilting flat-bed trailer for use by contractors in hauling heavy equipment is manufactured by Hobbs Mfg. Co., 609-623 No. Main St., Fort Worth 1, Texas. It is available with either single or tandem axle.

The Hobbs Self-Loading Float may be loaded by one man, the manufacturer says, due to its design. A power winch on the truck lowers the trailer to a ramp position. Then the truck is backed up to the rear of the trailer, and the winch pulls the load on. If the equipment is mobile, it can, of course, be driven up under its own power. The truck is then brought around to the front and the winch raises this end to traveling position.

Two types of fifth wheels are available: the standard semi-automatic fifth-wheel king pin, or an inverted semi-automatic fifth wheel mounted under the trailer. Both types are 33 inches.

Oak floors are standard equipment on all models. Brakes are 16½ x 6 x ¾-inch vacuum-operated with 13-inch-diameter boosters, 800-pound pull, 4,000-cubic-inch vacuum tank, slack adjusters, relay valve, break-away features, and tapered Timken linings. The spring-axle model has a Timken heavy-duty over-size 5-inch tubular axle with heavy-duty Timken roller bearings and adjustable radius rods; the tandem-axle model has two axles of the same specifications. The Hendrickson rocker-type tandem-axle assembly is used.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 16.

Waterproofed Tarpaulins

The tarpaulins and other canvas goods which it manufactures are described in a broadside issued by the H. Wenzel Tent & Duck Co., 1037 Paul St., St. Louis 4, Mo. These products include the Para waterproofed tarpaulins, Eagle-brand drinking-water bags, and Wenzel wall tents.

The bulletin contains photographs of Wenzel products in use, and lists sizes in which they are available. It explains that Para waterproofing saturates tarpaulin and tent fabric completely and functions even after the surface is worn

down. All tarpaulin seams, it explains, are double-stitched, and rustproof grommets are employed at each corner and along edges. Wenzel Para waterproofed tarpaulins are carried in stock by equipment dealers practically everywhere.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 80.

New Lubricant Test And Rust Preventives

New developments in the petroleum industry were brought out at a conference of international representatives held by the Freedom-Valvoline Oil Co., Freedom, Pa. The conference marked the first anniversary of the present name of the organization, which was adopted at the beginning of 1946 with the merger of the Valvoline Oil Co., the Galena Corp., and the Freedom Oil Co.

Mention was made in conference papers of developments in automotive, aviation, marine, and industrial oils and lubricants, and new products for rust removal and rust prevention. The company engineers revealed a method which can determine whether an engine fault is due to the lubricant or to inefficient operation. The oil is drained and scientifically tested, and often minor operation flaws can be caught before they become major, said one speaker.

Five new rust-control products were presented at the meeting. The protective characteristics of these products range from the removal of fingerprints from close-tolerance instruments, to the removal of ¼-inch rust scales from heavy metals. These surfaces are then covered with other preventives which protect for periods up to two years.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 19.

New Cylinder Manufacturer

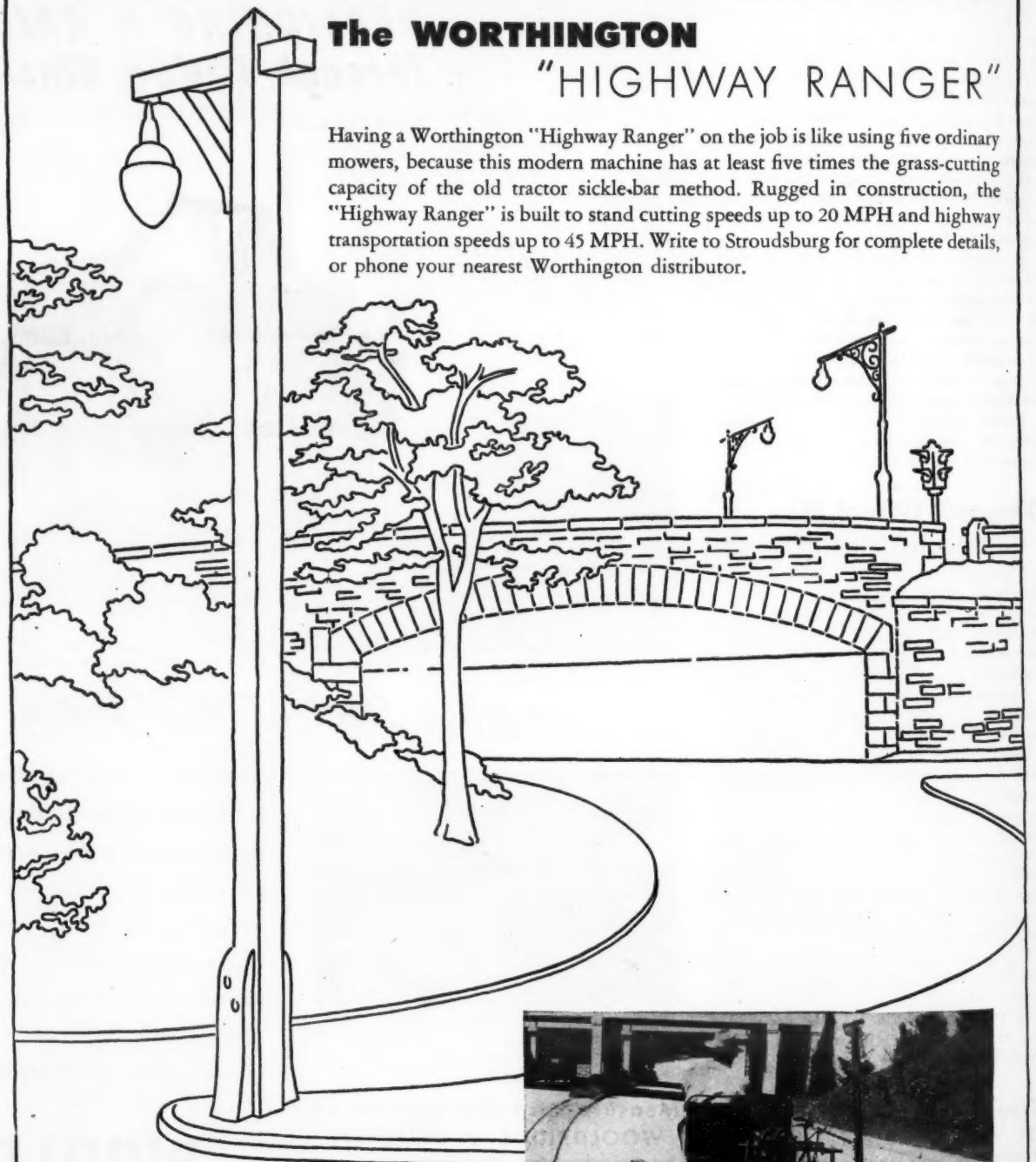
A new company has been formed for the manufacture of air and hydraulic cylinders. In addition, it will engage in the design and manufacture of special machinery and equipment. Distribution will be on a national scale. Known as The Hydro-Line Mfg. Co., its offices and plant are at 711 Nineteenth St., Rockford, Ill. Its President, G. A. Markuson, was formerly associated with the John S. Barnes Corp.

The country's leading highway departments specify

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"HIGHWAY RANGER"

Having a Worthington "Highway Ranger" on the job is like using five ordinary mowers, because this modern machine has at least five times the grass-cutting capacity of the old tractor sickle-bar method. Rugged in construction, the "Highway Ranger" is built to stand cutting speeds up to 20 MPH and highway transportation speeds up to 45 MPH. Write to Stroudsburg for complete details, or phone your nearest Worthington distributor.

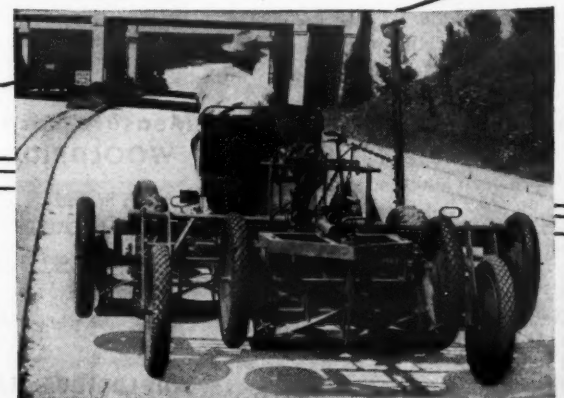


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The Biggest Little Motors in the world for use where power is not practical, available, or sufficient.

2-Ton "Lightweight"	75 ft. 1/2"
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With patent gear change and positive internal brake that never fails, and will lock load.	
Gear Ratios	
2-Ton 4 & 22 to 1	Weight 60 lb. Price \$ 70
5-Ton 4 & 24 to 1	Weight 110 lb. Price 90
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Soil Conservation Service Photo

On construction of lateral drainage ditches in the Brazos-Robertson Soil Conservation District, Texas, Carryalls remove 12 yards of dirt on each cut and spread the spoil in the same direction. A blade smooths and finishes the spoil banks.

Drainage Planned For Wet Farmland

Soil Conservation Work In Sizable Amounts Will Be Done by Contract for Conservation Districts

+ EARTH-MOVING which runs into millions of cubic yards is high on the master plan for agricultural development of the Texas and Louisiana Gulf Coast region. Working through cooperative soil conservation districts, and helped by technical and engineering brains of the Soil Conservation Service, farmers in the lowlands have proved to themselves the feasibility of such a master drainage program.

In all likelihood the districts will let some nice contracts. Some work, in fact, is already under way. The excavation jobs planned call for familiar draglines, bulldozers, and ordinary construction tractor equipment. But while a few of the districts have their own limited equipment, left over from the days when the Soil Conservation Service was a demonstration agency, they plan to use it mostly on small marginal jobs not large enough to let by contract.

The program has been conceived in the minds of the people of the region, with technical details filled in by the

Soil Conservation Service of the U. S. Department of Agriculture. That kind of cooperation is the whole concept according to which the Soil Conservation Service functions.

Program Is Integrated

The activities of the Soil Conservation Service are among the most democratic of all Governmental agencies. It has to

depend upon Congressional appropriations for its operation, and yet fully 85 per cent of each appropriation is expended on the salaries of engineers, soil technicians, surveyors, and agronomists. The other 15 per cent goes for office-building rental, automotive transportation, and materials.

The Western Gulf Region, of which Fort Worth is headquarters, does no construction work on the land. That must all be done by the people themselves, under a cooperative and legally authorized group plan called a Soil Conservation District. Some districts are small; others total 2,500,000 acres. Problems vary.

District programs and work plans serve a number of purposes. Perhaps one of the most important is the opportunity afforded all the people in a district to work together in devising a solution to their problems. For almost invariably these problems can best be solved by the district approach. The district plan serves as a guide to all concerned, telling them how to work towards a common goal. To the Soil Conservation Service, the programs and plans serve as a basis for providing assistance to the district.

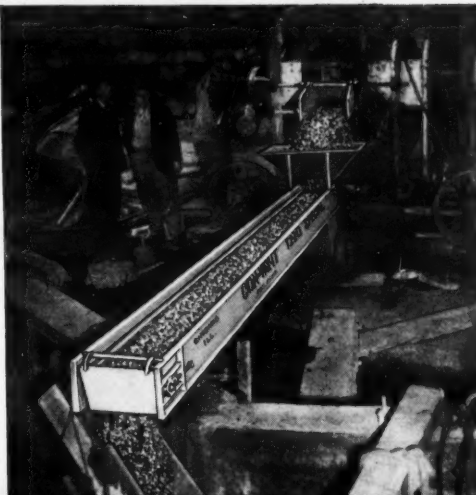
For example, a district drainage plan (Continued on next page)

CON-VAY-IT CUTS CONSTRUCTION COSTS

Contractors using this marvelous new Concrete Conveyor are saving as much as 80% on the cost of pouring concrete.

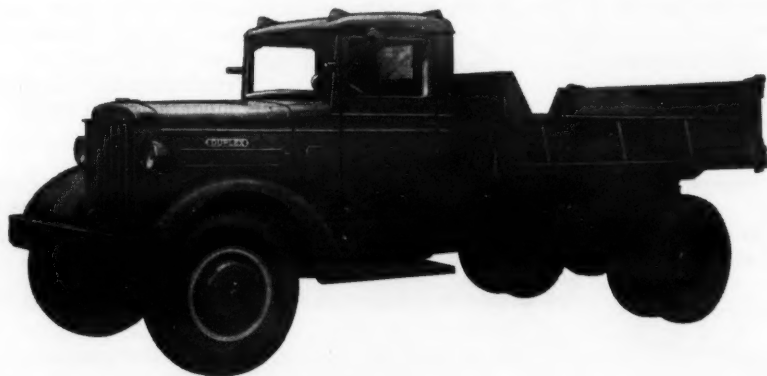
CON-VAY-IT speeds the job too! Electrically operated, it delivers up to a cubic yard of wet concrete a minute — down, horizontally, or to a height of 8 ft. Other models are available for greater heights.

It will pay you well to put CON-VAY-IT 12-20 Concrete Special to work for you without delay—write TODAY for details.



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Order 50 lbs. as a trial. You'll standardize on the improved EXTRUSION COATED STOODY SELF-HARDENING thereafter for protecting all earth-working equipment! No change in price. Available in 1/4", 3/16", 5/32" and 1/8" rod diameters. OVER 600 U. S. DEALERS.

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Drainage Is Planned For Wet Farm Areas

(Continued from preceding page)

must consider not only two or three farmers or ranchers who operate large acreages. It must consider an entire watershed. Unless it does, people who live below a well drained section may have a great deal of trouble getting rid of the water. That is why the first drainage projects are likely to be the big heavy-duty canals at the lower end of a comprehensive system, and well worth looking at by the average small contractor.

Soil-conservation districts are political subdivisions of a state, and responsible only to the State Legislature. The Soil Conservation Service is responsible to Congress. Each organization is responsible by law for prosecuting a program which provides for the use of land in accordance with its capabilities and needs. Yet, since one is a state and the other a national organization, each one must handle its own administrative responsibilities. In a way, that seems to be a good system of balance.

The Soil Conservation Service is giving farmers and ranchers technical assistance in the use of land. This assistance is provided chiefly to conservation districts in accordance with memoranda of understanding.

According to Regional Conservator Louis P. Merrill, the soil-conservation districts have proved to be the best medium for getting improvements applied to the land and maintained. For supervisors are assuming more and



Soil Conservation Service Photo
A Chambers County, Texas, Bucyrus-Erie dragline works on a ditch which will drain water from a county road as well as from several hundred acres of the ranch on which it is located. Technicians in the Trinity Bay Soil Conservation District helped lay out the lines for the ditch.

more of the leadership which is rightfully theirs. The drainage program for the Gulf Coast will be done under the leadership of farmers.

Drainage Ditches

The work which already has started under the program has begun generally towards the lower limits of the drainage system, in the low wet lands along the Gulf. A few contracts have been let in Louisiana, Texas, and Arkansas.

Construction will follow certain proved and well established hydraulic designs developed over the years by the Department of Agriculture. There will be no more of the old-type ditches with parabolic sides. In general, the ditches will be dug to fair limits of tolerance for line, more exacting limits for grade, and they will be possible to excavate with a

conventional dragline.

Smaller trenches may be dug by motor graders as the land is developed,

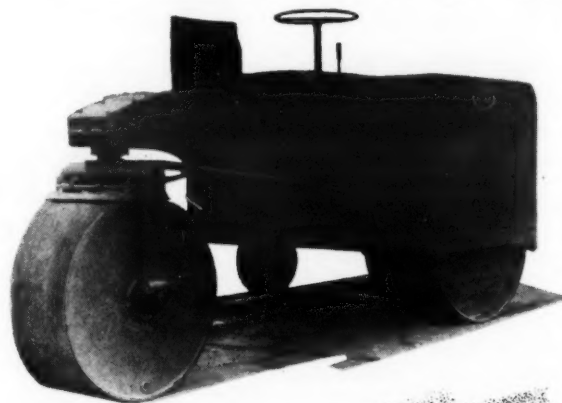
and in almost all cases the excavated dirt is spread so it can be used for crop production.

Dam Work Also Planned

The Soil Conservation Service itself may also have to call for contract bids for the repair of about ten dams and spillways. Back in the early '30's, when the Resettlement Administration bought up several hundred thousand acres of marginal land, it engaged in certain recreational development. Dams were built, reservoirs created, and the lakes stocked with fish. The social angle was stressed perhaps more, than the engineering design, because faults have since developed in most of the structures. These dams were transferred to the Soil Conservation Service in 1938.

In order to save the dams, about \$2,500,000 worth of contract repairs will have to be made. The estimates have already been prepared, designs adapted to spillways now existing, and the recommendation forwarded. It is hoped

(Concluded on next page)



APSCO Presents a New Trench Roller

One of the highlight features of this new trench roller is the leveling wheel which is pneumatic tired, with adjustment by powered screw-type leveling unit.

Automotive-type steering gives unmatched maneuverability, allowing 45° turning radius. Two engine types are available, either Hercules or the Willys Jeep, with two speeds forward and reverse. Every journal is carried on Timken or Bower tapered bearings and is sealed in oil.

Roller is equipped with twin airflex or twin disc-type forward and reverse clutches. Front roll is 15" wide and rear roll has width of 18".

Write today for complete specifications of this modern trench roller.



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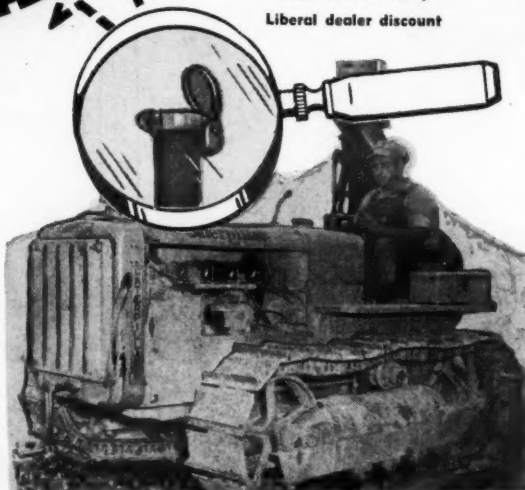
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... Just slip the "RAINCAP" over the open end of your tractor exhaust, and you eliminate forever the danger of moisture falling into the exhaust, injuring your tractor.

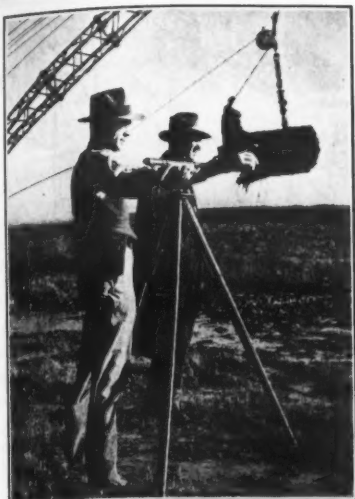
THE CAP THAT DOES NOT FORGET TO CLOSE... Completely automatic—the "RAINCAP" is counter-balanced to open when the tractor starts and close when it stops. Rust proof—made of cast aluminum—can be installed in two minutes. F.O.B. Waterloo, Iowa.

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No.	O.D. Exhaust	Price
1	2 1/8"	\$1.90
2	2 3/8"	1.90
3	2 3/4"	1.90
5	1 7/8"	1.90
55	2"	1.90
6	1 1/2"	1.90
7	2 1/2"	1.90
8	3"	2.50
9	3 1/8"	2.50
10	3 1/4"	2.50
11	3 1/2"	2.75
12	4"	3.00



WATERLOO FOUNDRY CO., WATERLOO, IOWA



Soil Conservation Service Photo

One of the functions of the Soil Conservation Service is to supply engineering and technical help in the use of the land. It provides this assistance chiefly to cooperative conservation districts, which have proved to be the best mediums for getting improvements applied to the land and maintained.

Drainage Is Planned For Wet Farm Areas

(Continued from preceding page)

that this repair program may stretch over a period of several years, so that the work can be done efficiently by contractors under supervision of the present engineering staff.

Compared to full-scale heavy construction, the work projects will be small, of course. But the overall yardage involved will run into impressive figures. It is exactly the sort of work for the small contractor who is interested in the development of his community as well as in profits. Both are possible and probable on an efficiently run job.

The Soil Conservation Service is helping contractors in the districts by holding short-course schools on the methods and purposes of land leveling, terracing, drainage construction, and irrigation. It is showing contractors what is wanted, why the methods recommended will work best, and what the finished work will do for the community.

Colored Asphalt For Traffic Striping

A special Albino asphalt with which paint pigment can be mixed is produced by the Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y. This material—unusually light in color—may be used wherever colored effects are desired, as for traffic stripes.

Albino is used as a binder in such cases, since it does not diminish to any great extent the color value of the pigments used in the mix. Colors which can be used are red and yellow.

Mix specifications for traffic-lane markings are set at 10 per cent pigment, 9 to 10 per cent Albino, or equal, and 80 to 81 per cent sand. The sand is heated to between 225 and 250 degrees F, and the pigment added. The two are then mixed until a homogeneous mix is obtained. The Albino is heated to 200 or 250 degrees F in an approved clean kettle. The proper amount is then added to the mixed sand and pigment, and mixed until the whole mass is of a uniform color.

The mixing should be done in a clean pugmill, plaster mixer, or other approved machine, so located that the temperature of the mix will not fall below 205 degrees F when placing the material in the road.

In placing the asphalt, a trench true to the lines, width, and depth called for by the plans is cut with a jackhammer, or by any other approved method which will give a true edge. Then the material is spread by a spreader box, by two

sheets of metal held upright within the trench and slid along as the material is placed, or by some similar method. The engineer determines the amount of loose material necessary to compress to the true lines as shown on the plans. After placing, the material is tamped from the edges in to the center with hot tamps, and then thoroughly rolled.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 13.

Tractor Equipment Shown

An illustrated pamphlet showing its line of tractor equipment is now being distributed by the Trackson Co., Milwaukee 1, Wis. It is full of photographs of the equipment in use.

Units illustrated are Traxcavators, pipe layers, and swing cranes. In addition to the photographs, specifications are listed for all equipment models.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 53.

Highway-Safety Group Plans to Meet in June

Members of the coordinating committee of the President's Highway Safety Conference recently met with President Truman to discuss details of the second national meeting of the group to be held in Washington, June 18-20.

There was a preliminary meeting with Major General Philip B. Fleming,

Federal Works Administrator and Chairman of the Conference. Then the President and the committee members considered the program for the coming conference during which representatives of state, municipal, and civic groups, and non-official organizations will report on progress made in highway safety in their respective localities since the initial President's Highway Safety Conference last May.

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PLAN NOW for NEXT WINTER. No matter what the snow or ice conditions, you obtain FASTER • SAFER • CLEANER snow removal with the lighter, yet stronger DAVENPORT-FRINK SNO-PLOWS. Available in "V" and Straight Blade types for all sizes of trucks, tractors, road patrols and locomotives. Be ready. Buy early. Write us for complete information.

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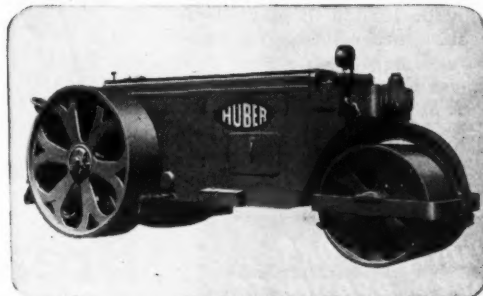
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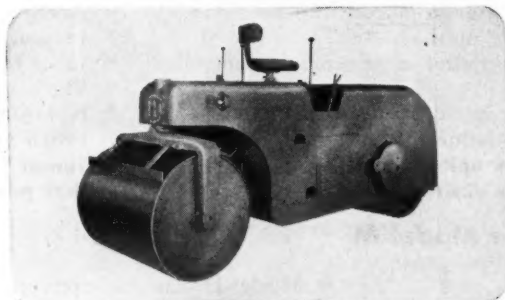


"YOU DON'T MEAN TO TELL ME YOU NEVER SAW HUBER ROAD MACHINERY IN *Action...*"

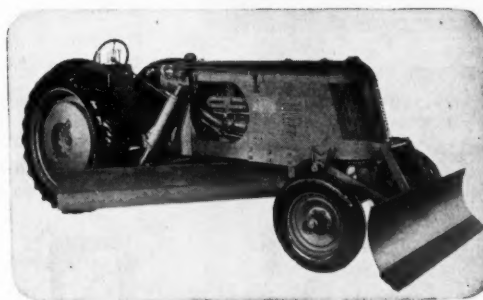
Speed power economy all of the things you need to make Road Machinery a sound and profitable investment are built into Huber 3-Wheel Rollers, Huber Tandem Rollers, and the versatile Huber Maintainer to keep you on friendly terms with budgets. Huber Road Machinery is dependable because Huber knows how to build road machinery that incorporates all of the things you need to do a good job. Why not arrange for a demonstration through your Huber Distributor? He will show you what we mean.



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Variable weight, built in sizes from 3 to 12 ton.



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ROAD ROLLERS
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Tips on Safe Use And Care of Jacks

**Accidents Can Be Avoided
And Time and Money Saved
By Following a Few Rules
For Various Jack Types**

† THE much abused jack might be characterized the "forgotten tool" of the construction industry. It is habitually left out in the snow and rain, always starved for oil and grease and attention, inevitably overloaded or otherwise misused. Luckily, though, it can take a good deal.

As a matter of fact, most construction jacks are specifically designed to withstand long periods of misuse with no particular maintenance. But sooner or later every jack-user finds himself with a number of inoperative jacks. These damaged tools make up an inventory of necessary equipment which is expensive to replace and which can be troublesome to repair. Much of this loss is unnecessary and could easily be avoided with a little preventive maintenance and a little handling care.

General Rules

While proper maintenance and handling vary somewhat for the various types of jacks, there are a few rules which apply to them all. These rules make sense and save a lot of time, money, and accidents. If you are already following them, you are not the average contractor or maintenance man, but you're a smart one.

1. *Have a sufficient supply of the right types of jacks for your operations and for all emergencies.* A 10-ton jack won't raise a 15-ton load safely. So be careful in selecting your jacks, to secure the proper capacity and type for the load.

2. *Keep your jacks handy.* Designate a spot where they are to be stored when not in use. Keep them painted a bright color for quick identification. For if they cannot easily be located, it may seem simpler to the worker to use his own muscles instead.

3. *Don't use defective or unsuitable jacks or jack handles.* Check both jack and handle before using to make sure both are in good condition. A damaged



Pity the poor jack, habitually overloaded, starved for oil, left out in the rain and the snow.

handle can waste time and energy and may cause painful injuries.

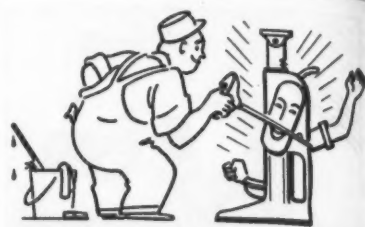
4. *Don't allow incompetent men to handle your jacks.* Jacks are valuable tools. Be sure that their users are competent and careful, not only to prevent injury to themselves or the jacks, but to equipment they may be working on. The cost of the jack is negligible com-

pared to the cost of the equipment it lifts and supports and to the cost of an accident.

5. *Don't overstrain jacks.* If the load is heavier than the jack's rated capacity, or if in doubt, use a stronger jack. And when using a foot lift, figure its capacity as one-half the rated capacity of the jack, since such loads are carried eccentrically and are not centered as are head loads.

6. *Place the lifting toe squarely and all the way under the load when using a foot lift.* Then when pressure is applied, the jack will not slip out and drop the load. Particularly during the raising operation, watch the load to see that it does not work out on the toe.

7. *Make sure jacks are centered, plumbed, and properly blocked.* The base of the jack should rest on an even, unyielding surface; otherwise, block up the jack bottom. For a tilted or moving jack will cause the load to shift during raising, holding, or lowering. Also, make sure the head of the jack is against a solid part of the load so that movement



Don't forget me. I thrive on cleaning and regular oiling. . . I give better service when you give me care.

will not cause the load to slide or rock. Don't jack steel against steel—use wood shims. To obtain the maximum lift in your jack, always block as closely as possible to your load.

8. *Never leave a load on a jack without blocking.* When the lift has been made, block the load to prevent its sudden dropping if the jack is jarred or accidentally tripped.

9. *Remove the jack handle from the socket after a lift is made.* This prevents stumbling over it or bumping it acci-

(Continued on next page)

Fastest Known Pneumatic Method for TAMPING Backfill

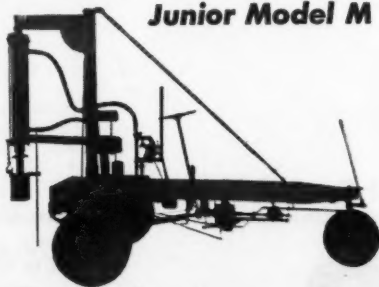


Break Concrete—The Low Cost Way with RAPID PAVEMENT BREAKER MACHINES

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- Not a drop weight, but a pneumatic controlled blow.
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- Saves labor-time-dollars.
- Built to have a low upkeep cost.
- Breaks to any size desired.

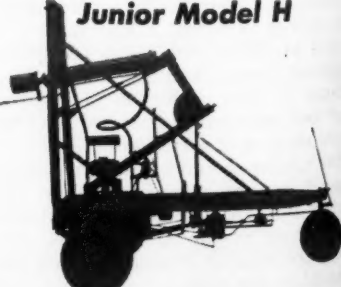
- Adapted to inside or outside work.
- Increases your compressor output.
- Ideal for cutting trench and tamping backfill.
- The profitable addition to your line of equipment.
- Heavy-duty machine equipped with air motor which pivots the unit on the truck bed.
- Junior Trailer Models are equipped with air motor that propels machine and swings the boom.

Junior Model M



- Model-H can be converted to vertical machine in 30 minutes.
- Junior Model T for mounting on truck with compressor also available.
- Write for details and prices.

Junior Model H



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Tips on Safe Usage, Maintenance of Jacks

(Continued from preceding page)

dentally and moving the load.

10. Don't set the jack in lowering or tripping position until ready to lower. Instead, leave it set for lifting. Then if the socket lever is moved, the jack will raise, not drop, the load. This is the safest way to prevent accidental tripping or lowering.

11. Make sure all hands and feet (both the other fellow's and your own) are in the clear before lowering a jack. Remove all tools and equipment from beneath the load.

12. Put jacks away when no longer needed. If one is left standing up, workers are apt to stumble and fall over it.

13. Oil jacks regularly, at least once a month. Fill all oilers and oil all moving parts. Keeping jacks well oiled makes them work easier, and saves wear on moving parts. Don't continue to use a jack which has not been properly maintained—cleaned, oiled, greased.

14. Take time to train your men in proper jack handling and maintenance. It pays off. Why not post charts on your construction-shed or shop walls as a constant reminder?

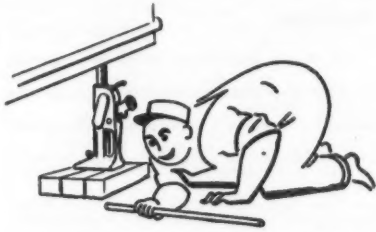
Special Rules

In addition to these general rules, varying degrees of special attention should be paid to the individual jack groups.

Screw Jacks. With the exception of bell-bottoms, all of these jacks are geared and should therefore be maintained and lubricated like any other machinery. Upon receipt, check them for oiler plugs. The oilers should be kept filled since they usually feed the ratchet and pinion bearing. It's a wise practice to fill them and to oil all exposed moving parts with a good grade of light oil before each period of jack usage. The moving standard which is often exposed for considerable periods may be given a light grease coating occasionally.

Screw jacks should be partially disassembled every six to nine months, inspected for proper functioning, and repacked with grease. Remember that they have ball bearings which must run in a well greased race. For best results, most of the jack manufacturers supply a special low-cold-test, heavy-duty jack grease.

When screw jacks become damaged or inoperative, first investigate the source of trouble. If this is minor, order new parts and make simple repairs. But for major repairs requiring replacement of shells, housings, and other large parts, it is advisable to return the jack to the manufacturer for appraisal and major overhaul. If you have damaged an "old" jack (as a rule of thumb, old jacks are those which have seen heavy service for five to ten years or do not appear in the manufacturer's current catalog), it is probably



Take out the handle when the lift is made, so you won't stumble over it and jar the load.

economical to buy a new and improved one.

In the case of bell-bottom screw jacks, the screw threads should be kept as free from dirt and grit as possible and should be lubricated with light machine oil. Most of these jacks have ball-bearing-equipped tops which should be periodically greased. Since bell-bottoms are not enclosed to the extent of other screw jacks, they tend to rust and become dirty quickly unless special care is taken.

Ratchet Jacks. Various manufactur-

ers have different spring mechanisms in the ratchet lowering devices, but the basic principles are quite similar. In most cases, the spring mechanism can be adjusted by a screw. Don't turn this screw too far; only a slight turn is necessary to bring an even "click" to the pawls on the up and down strokes. Where there is no adjusting screw and when there is pawl-overtravel, new springs should be inserted.

The rack-bar teeth on all ratchet jacks should be kept clean and free of grit, as should the pawl seat. The rack bar should be kept greased on the back with graphite grease, but the toothed side should not be greased. Trunnion bearings should be cleaned and graphite grease added at least once a year.

The disassembly and repair of ratchet jacks is relatively simple and can usually be carried out at the contractor's or highway department's equipment-repair shop. In cases where damage is so severe as to warrant returning the jack to the manufacturer, it is usually sufficient to warrant buying a new jack.



Block it up if it's resting on a soft or uneven surface, and it will hold a load for you firmly.

In the case of track jacks, substantially the same maintenance instructions apply. Instead of the detailed spring-frame mechanism, there is usually a simple spring which is readily replaced. Track jacks are not recommended for most construction jack jobs since they are designed to trip the load, a special feature for rail work.

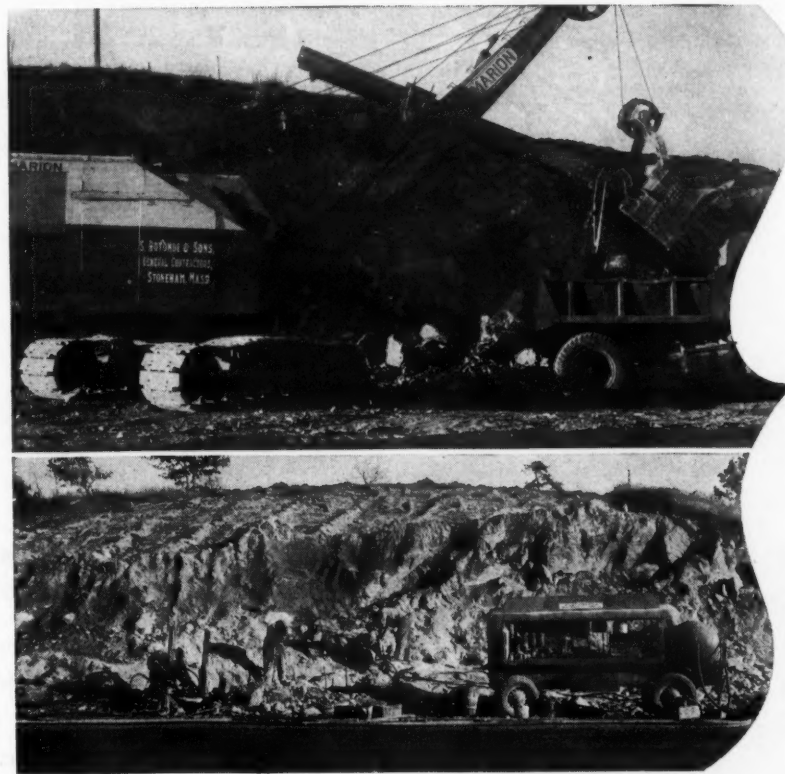
Hydraulic Jacks. These are precision equipment pieces and must be treated with more care than mechanical jacks.

(Concluded on next page)

Gulf Quality Lubricants and Fuels

help contractor keep ahead of schedule

on tough highway job!



S. Rotondi & Sons, Stoneham, Mass., have the contract to widen and pave approximately 2½ miles on Route 107 between Lynn and Salem, Mass. This \$433,000 job involves blasting and removal of rock from solid ledges up to 300 feet long and 25 feet in height.

"OUR EQUIPMENT has performed without a hitch on this road job with Gulf quality lubricants and fuels in service," says Charles Rotondi of S. Rotondi & Sons. "That's one big reason why we're keeping ahead of schedule, with very low costs for maintenance."

The use of quality petroleum products is one of the surest guarantees of efficient job operation and lower maintenance costs for equipment—which add up to greater profits! That's why so many leading contractors engaged in all types of construction work specify Gulf lubricants and motor fuels. They deliver an extra margin of performance!

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Tips on Safe Usage, Maintenance of Jacks

(Continued from preceding page)

cal jacks. Since they will often not give good performance unless properly handled, the manufacturer's instructions should be always adhered to closely.

When operated on their side, they should be placed carefully on the rest plate provided on the higher-tonnage jacks. If there is no rest plate, extreme care should be used to keep dirt off the ram. Except for the remote-control types, it is a good general rule that hydraulic jacks should not be left or operated upside down. Care should also be taken that they are not left unattended in a supporting position for long periods, since settling may occur.

The bulk of hydraulic-jack operating trouble is derived from the use of brake or shock-absorber fluids, alcohol, castor oil, or other improper types of oil. It is urged most strongly that only an approved hydraulic-jack oil be used. Generally, annual draining and refill is sufficient service; under constant use, jacks may be flushed every six months.

Leaky or sticky valves will cause a hydraulic jack to fail, or to operate poorly. Often this condition can be corrected without disassembly by opening the release stem and pumping the jack handle up and down several strokes in order to rush the oil through the lines.

Worn cup leathers will prevent the pump from creating pressure and will keep a jack from holding a load. These cups are quite inexpensive and should be replaced at the first indication of wear.

Hydraulic jacks are often received in an air-bound condition which can usually be relieved by pulling up the ram, opening the release valve, and pushing the ram down. Or, an air-bound tank may be caused by the use of too much oil. In this case, the oil should be drained down to the filler-hole level when the jack is in normal operating position.

There are service stations for hydraulic jacks in most cities, or the manufacturer can tell you of the nearest approved station. For major overhaul and repair, it is usually advisable to use these stations unless you have enough jacks in use to warrant training your own repair man.

Air-Motor Jacks. This type of jack, originally designed for locomotive and freight-car lifting, is just coming into construction usage. For such heavy work as building moving, bridge raising, and pipe forcing, these jacks offer the advantages of high tonnage capacity, good mobility, and single-man operation of two jacks.

For the most part, field maintenance of air-motor jacks consists of daily oilings, monthly grease refills, and semi-

Range of Jacks Available

SCREW JACKS

1. JOURNAL JACKS are usually 10 inches high, capacities of 15 to 50 tons. General-duty lifting and supporting work.
2. STANDARD-SPEED JACKS are from 20 to 30 inches high, capacities of 10 to 100 tons, mechanically raised and lowered. Specially built for bridge, wrecking, and other construction work.
3. SELF-LOWERING JACKS are similar to Standard-Speed except that lowering is accomplished automatically by a governor or similar mechanism.
4. BELL-BOTTOM JACKS OR JACK SCREWS, are the simplest and cheapest of all jacks. From 8 to 30 inches high, capacities of 5 to 30 tons.

RATCHET JACKS

1. RATCHET-LOWERING JACKS range from 14 to 38 inches high, capacities of 5 to 35 tons, mechanically raised and lowered. Usually have foot lifts. General-purpose jacking tool of wide application. Special adaptations for cable reel work, pole pulling, and angle operation.
2. TRACK JACKS, OR TRIP JACKS, are nearly all of 15-ton capacity. Mechanically raised but lowered by tripping. Intended almost exclusively for track repair and dangerous for general duty.

HYDRAULIC JACKS

1. STANDARD-TYPE JACKS are usually self-contained units, about 10 inches high, and have capacities of 3 to 100 tons. Models under 15 tons have hand extension screws; some over 15 tons have dual pumps.
2. REMOTE-CONTROL JACKS have pumps connected to ram by variable-length hose. Capacities of 2 to 70 tons.
3. PUMP JACKS are built with as much as 500-ton capacity, operated by outside or independent pumps.

AIR-MOTOR JACKS

Usually wheeled, these are operated from a compressor, and range from 20 to 100-ton capacity. Used for pipe pushing or special heavy-duty control. Can be used in pairs from one hose connection.

SPECIAL JACKING DEVICES

These include the common trench and timber braces, shoring jacks, push-and-pull jacks, and roof jacks. Used for general bracing and support work and for pulling together or pushing apart structural members. Capacities from 1 to 15 tons.

annual motor removal and blade inspection. The manufacturer furnishes detailed lubrication and maintenance charts.

Special Jacking Devices. Steel trench braces require almost no maintenance other than an occasional oiling and cleaning of the screw. When not in

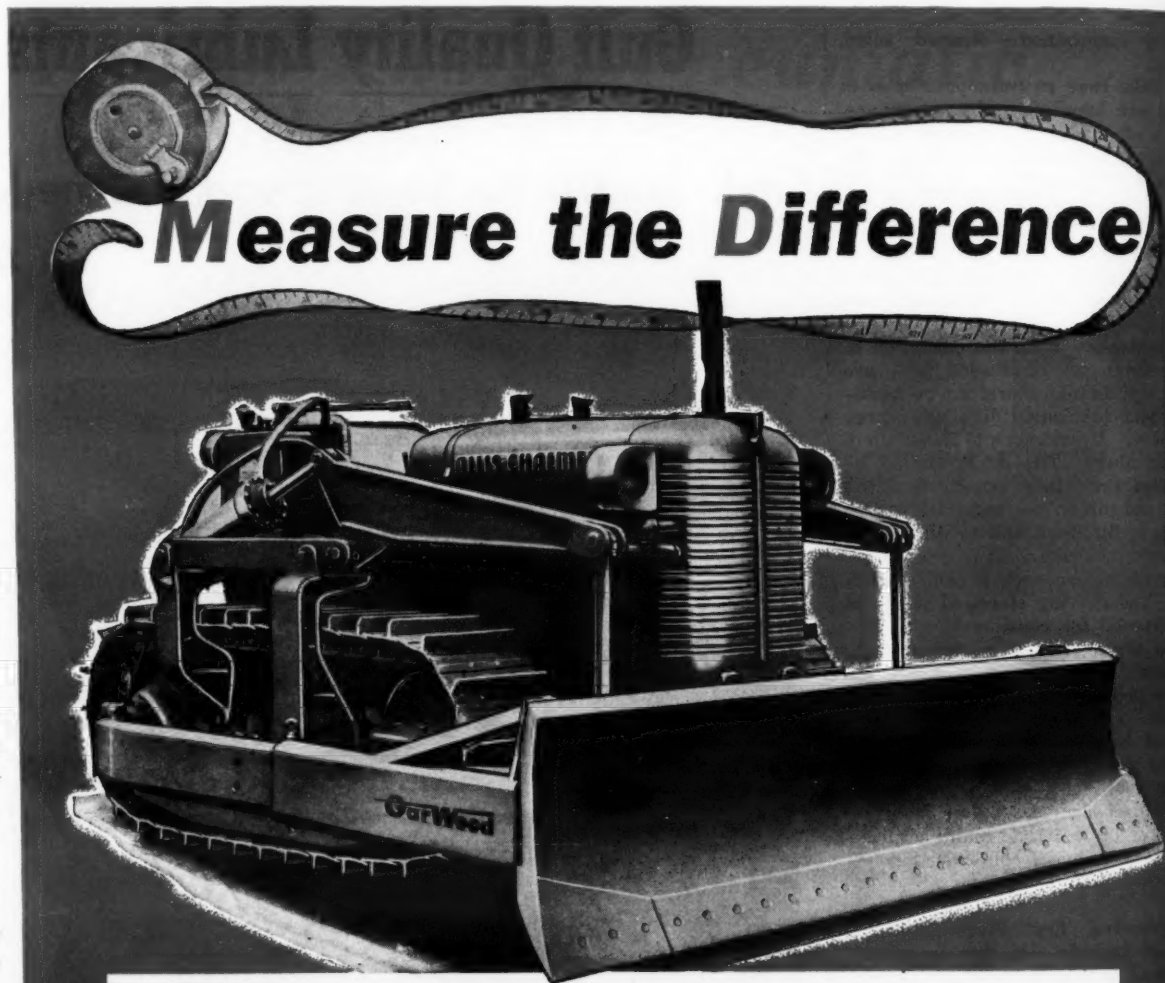
use, the brace should be closed so that the screw length is least exposed.

Mine-roof jacks, often used in tunnels for temporary shuffling, need no more maintenance than a trench brace since there are few exposed working parts.

Push-and-pull jacks are maintained by regularly oiling and cleaning the screw and the ratchet case. These are valuable tools and become even more valuable when used with chains, hooks, or pipe sleeves. But extreme care must be exercised in seeing that solid bases or secure connections are afforded.

Table-adjusting jacks, used to adjust the height of truck-loading platforms, and pinion pullers, used to jack pinions from machinery shafts, require regular oiling and attention since they have gears and bearings.

And finally, you can't do a good job of jack handling unless you know the range of jacks available. See the accompanying table for this information. Then be sure to select the proper jack for the job.



Performance against performance... just measure the difference... and see for yourself just HOW FAR AHEAD OF THE FIELD GAR WOOD ROAD MACHINERY REALLY IS.

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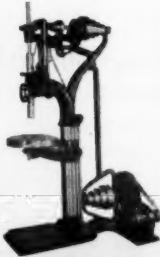
and general contracting GAR WOOD ROAD MACHINERY means dependability, rugged strength, less down time, precision engineering, practical operating costs — all factors that put Gar Wood far out in front of the field.

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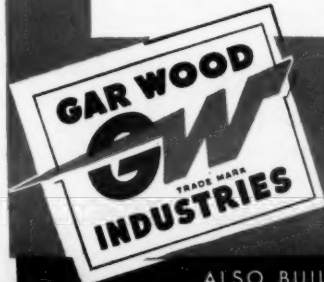
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"It's only the timekeeper making the morning field check."

Gravel Screen Has 3-Point Suspension

A heavy-duty vibrating screen designed for sand, gravel, or crushed stone, either wet or dry, has been announced by the Smith Engineering Works, 4014 No. Holton St., Milwaukee 12, Wis. The Telsmith Vibro-King is a two-bearing outgrowth of the four-bearing Telsmith Pulsator.

The manufacturer still recommends the Pulsator for scalping service and for the finished screening of large-sized aggregates, or those sizes rejected by about 3 to 4-inch square openings.

It recommends the Vibro-King for finished screening of medium and small-sized aggregates, or those passing about 4 to 3-inch and smaller square openings, down to the finest mesh.

The vibrating unit is mounted in the center of the live-screen frame on two heavy-duty roller bearings. It is equipped with two counterweights specially designed and patented, automatically adjusted, and enclosed. These are said to prevent jumping at critical speeds. The main frame is horizontal and is usually supported from below. Suspension fittings, including cables and springs, can be furnished when desired.

The vibrating frame is mounted in the main frame on three nests of springs, one nest on one end and two on the other end, giving three-point suspension. These springs support the entire weight of the vibrating part of the screen. Thus the entire vibrating mechanism, including the vibrating unit and screen cloth, floats on springs. The spring suspensions have adjusting screws with which the screening angle can be changed enough for all screening conditions, the manufacturer says.

The Vibro-King has circular vibration claimed to be uniform and constant under either light or heavy loads. It can be equipped with a flat-belt pulley for flat-belt drive or with a grooved pulley for V-belt drive. Optional equipment includes steel screen trays on which the screen cloth can be mounted in rubber, or steel screen supports protected by rubber over which the screen cloth can be stretched.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 30.

Admixture for Concrete

A folder describing its Concretite, an admixture for use in concrete has been released by the Stonhard Co., 401 No. Broad St., Philadelphia 8, Pa. It is claimed by the manufacturer that Stonhard Concretite will produce concrete of high density, hardness, and bonding strength, as well as high-early strength. It is particularly applicable, the company says, to concrete for bridge abutments, retaining walls, foundations, and floors. It is said to provide protection against penetration by acids, oils, or greases.

Copies of this literature may be ob-

tained from the company. Or use the enclosed Red Request Card. Circle No. 63.

B-G Appoints New Dealers

The Barber-Greene Co. of Aurora, Ill., has announced the appointment of State Equipment Co., with headquarters at Harrisburg and a branch office at Wilkes-Barre, Pa., as exclusive distributor for central and southern Pennsylvania. This territory includes the counties of Union, Montour, Northumberland, Snyder, Juniata, Dauphin, Perry, Cumberland, Lebanon, Franklin, Adams, and York.

State Equipment announces that it will soon move into its new building at 3725 No. Front St. in Harrisburg.

Announced at the same time is the appointment of the Townsco Equip Co. of Oklahoma City as exclusive distributor for the state of Oklahoma. Townsco will represent the construction and industrial divisions, and provide complete facilities for sales, service, and repairs of all Barber-Greene products.



AD 164

Everybody has commented on the really beautiful four color illustrations contained in the VICTOR Bulletin Form 20 . . . it covers fine welding and cutting equipment . . . it will be yours, free, for the asking. Write us today for your copy.

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In each, you get exactly the right one of 7 engines—to give the pulling power you need with the economy you want.

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"Job-Rated" TRUCKS

Fit the Job . . . Last Longer!



This new Yaun spreader box can be attached to any standard dump body.

Spreader Box Fits On Dump-Truck Body

A lightweight spreader box which handles sand, gravel, shell, loose dirt, crushed stone, and similar materials has been announced by the Yaun Dragline Buckets & Mfg. Plant, P. O. Box 1508, Baton Rouge, La. The box designed for a 6-foot dump body weighs approximately 105 pounds and is bolted to the dump body, replacing the tail-gate. The company states that units can be furnished to fit all sizes of dump bodies.

In operation, the half-circle opening is regulated to any size aperture up to 6 inches. The materials pour through by gravity. A smooth even flow may be obtained in two ways, the manufacturer says: (1) a helper can walk alongside the truck, or ride on the body, and keep the flow even by regulating the opening; or (2) the driver can set the opening, and keep the flow regular by proper elevation of the truck body.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 28.

Goggles, Kit Serve As Eye-Safety Aids

A lightweight all-plastic safety goggle has been announced by American Optical Co., Southbridge, Mass. It is made with air-conditioned eyecups that reduce possible lens fogging, according to the manufacturer.

It is said that the design of the eyecups makes them lie back against the face, conforming closely to facial contours, and so relieves pressure on the bridge of the nose. Clear or green lenses are available. A swivel rod in the center of the goggles with a clamping nut at the top permits lens replacement. According to American Optical, these goggles may be worn over most types of prescription glasses.

Another eye-safety aid made by the American Optical Co. is a complete cleaning and servicing kit which contains cleaning fluid, tissues, and anti-fog compound. It is designed to be attached to a wall, and complete instructions are printed on its front panel. Dimensions are 13 inches long, 9 inches high, and 6 inches deep. It is made of hardwood finished in green lacquer.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 6.

Coupling Data Cover Choosing Proper Size

A 32-page catalog describing its line of Steelflex shaft couplings is now being distributed by The Falk Corp., 3001 Canal St., Milwaukee 8, Wis. It contains information on dimensions, on how to order, and on how to find the proper size of coupling by table or formula method.

In Bulletin 4100, the company claims that its Type F Steelflex coupling will fit approximately 90 per cent of all coupling installations. The catalog describes this standard coupling and all other couplings in the line. It shows

their method of construction and principle of operation. As an aid in selecting the proper couplings, 14 pages of the catalog are devoted to tables and instructions on this subject.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 50.

Column Clamps and Shores

A line of shore jacks, column clamps, and related equipment is described in the 12-page catalog issued by Symons Clamp & Mfg. Co., 4249 Diversey Ave., Chicago, Ill. The catalog describes the patented Symons metal scab, and tee and ell heads for use in conjunction with the shore jacks and extensions. It also describes the features of Ever Square column clamps, and the special clamps for long rectangular columns. The equipment is available for rental or purchase.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 72.



Heel of Bucket Rebuilt with Round Applicator Bars; Shovel Teeth Repointed with Wedge Bars

Write for
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Booklet on
"THE WELDING OF
11% TO 14%
MANGANESE STEEL"

REBUILD SHOVEL AND DIPPER TEETH WITH

MANGANAL

(Trade Mark Reg. U.S. Pat. Off.)

11% to 13 1/2% MANGANESE NICKEL STEEL

WEDGE BARS

IT'S FAST • IT'S EASY • IT'S ECONOMICAL

Manganal Wedge Bars come in 22 sizes to fit any shovel or dipper tooth. By using Manganal Wedge Bars considerable time and money is saved over the method of depositing layers of weld metal until tooth has been rebuilt.

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11% to 13 1/2% Manganese-Nickel Steel

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Takes any job in its stride
because—
there's power at every downstroke

IN many industries, the best power plant is one that picks up its load fast.

And among the first things that stand out about a General Motors Diesel engine is the way it takes up its load without any apparent slowing down.

The explanation is easy—there's power at every downstroke. No piston loafs through a single revolution as they do in most engines. So a "three" performs like a "six," a "six" like a "twelve"—smooth and powerful.

What's more, this means that the same power can be packed in an engine that's more compact and lighter in weight, that the engine starts easily, that it's clean, that it has fewer parts and is easier to maintain.

This makes the GM Diesel an outstanding power plant for any job you have. So if you are interested in low-cost, reliable, flexible power, be sure to get all the details about it.

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DETROIT 23, MICH. • SINGLE ENGINES... Up to 200 H.P.
MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS



Frostboil Prevention Feature of Road Job

Backfilling With Selected Material and Compaction In Cuts Used on 3.6-Mile Reconstruction Project

EXTENSIVE treatment for the prevention of frostboils featured the reconstruction of 3.6 miles of grade over State Route 60 in southern Minnesota last season. Unstable sections along the new grade were backfilled with selected material and cuts were compacted for an additional 1 to 2½ feet in an effort to correct the damage which occurs each year with the spring break-up.

Old State Route 60 between Madison Lake and the junction with concrete-surfaced Trunk Highway 14 was a narrow, winding bituminous-surfaced highway. Located in the heart of the state's richest farming land, the old road had long since been outgrown. Heavy private and commercial traffic pounded the worn-out wearing surface and swung around the average of two bad curves per mile on this 3.6-mile section. And each spring as the frost went out of the old grade, capillary action would cause great upheavals to appear along the surface of the road. Great furrows to match them appeared on the forehead of Charlie Motl, head of the Maintenance Division of the Minnesota Department of Highways. Something had to be done.

Reconstruction Features

Bids for relocating and reconstructing this 3.6-mile section of highway were received by M. J. Hoffmann, Minnesota State Highway Commissioner, in mid-summer, 1946. The contract for the work was awarded Brown & Leguil, Mankato, a pair of old Alaskan Highway builders, on their bid of \$62,297. The project involved the following principal items:

Clearing	2 acres
Grubbing	2 acres
Class C excavation	176,521 cu. yds.
Stabilized gravel in place	4,760 cu. yds.
Area sodding	13,043 sq. yds.
Seeding	42 acres

Where the old road had a shoulder-to-shoulder width of 26 feet, narrow ditches, and steep backslopes, the reconstructed grade has a shoulder-to-shoulder width of 36 feet with a pitch of ½ inch per foot. Shoulder slopes are 4 to 1, ditches are 3½ feet deep and streamlined, and backslopes are from 4 to 1 to 6 to 1. Another important feature of the reconstruction project was the elimination of no less than six bad curves with inadequate sight distance. There are only three gradual curves on the widened, reconstructed road.

Work Starts

On August 6, Brown & Leguil moved in on the job with five Gar Wood 15-yard scrapers, one LeTourneau 12-yard scraper, and that important adjunct of all successful construction operations, the Construction Superintendent, Kenny Kerns of Eagle Lake, late of Aleutian operations. There was a real kinship between Superintendent Kerns and several of the scrapers which, too, had seen Arctic conditions.

Clearing and grubbing were not extensive items on this contract. A Mall power chain saw quickly cut down the larger trees which were snaked away. And their stumps were taken out with two Caterpillar D7 dozer-equipped tractors. The scrapers went to work in side borrow areas and in the large cuts.

The 15-yard Gar Woods were motivated by Caterpillar D8's and the 12-yard LeTourneau by a Caterpillar D7. Despite the wet weather which made working conditions in the rich black loam most difficult, these six scrapers,

assisted in loading by a D7 pusher tractor, maintained an hourly average of 450 cubic yards.

Over sections where the old grade was reconstructed and widened, fill ran to as much as 4 feet deep. It was dumped in scraper-load layers, and the blade of the scraper spread the material evenly over the grade on a second pass. Compaction of each scraper-load layer was obtained with two sheepsfoot rollers. An Allis-Chalmers grader shaped and finished the grade.

The right-of-way for the grade extended for 75 feet on either side of the



C. & E. M. Photo

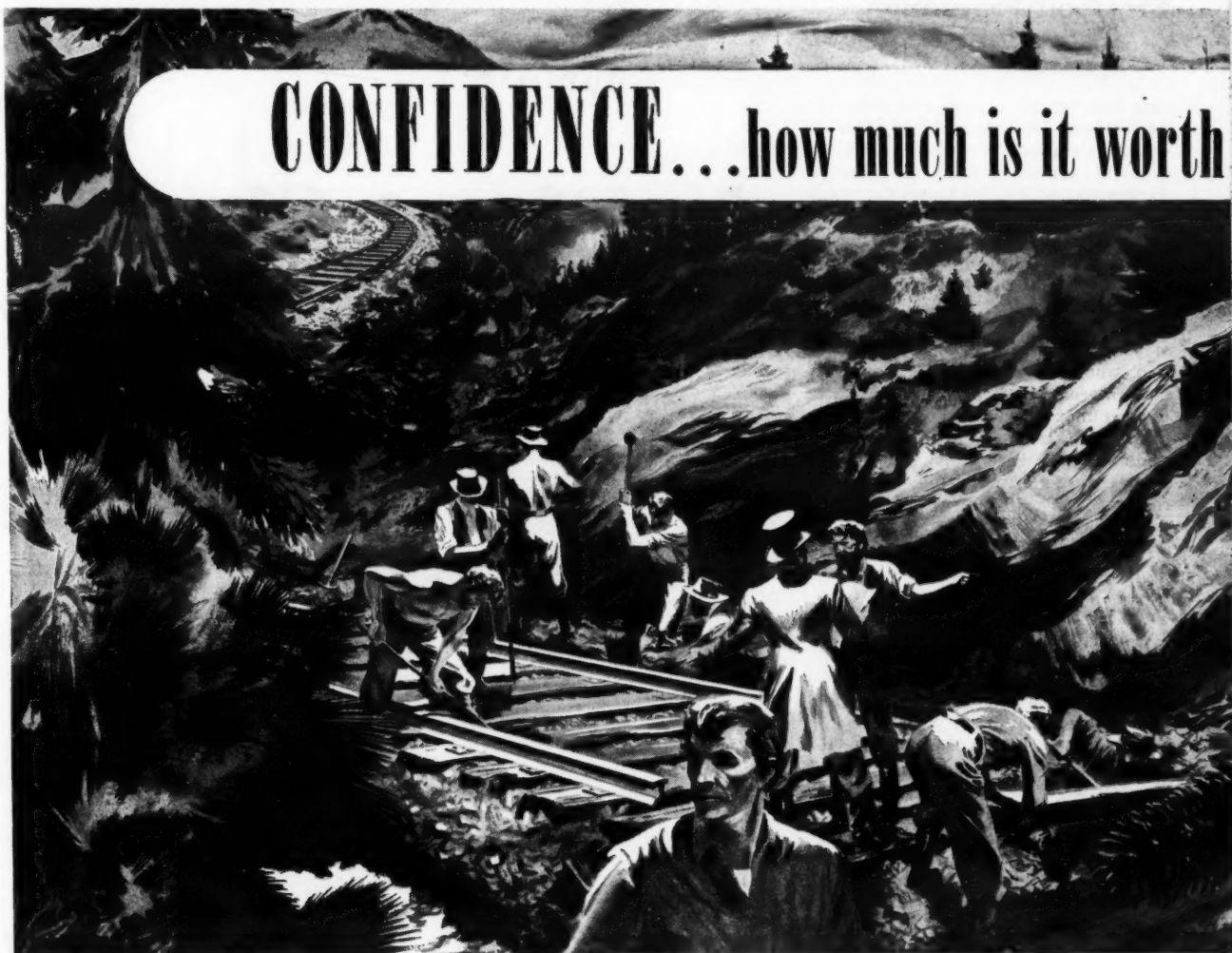
A Caterpillar D8 with a Gar Wood 15-yard scraper occupies the foreground in this grading line-up on the Brown & Leguil contract. The rich black loam is good for farming but difficult for road building, especially when wet.

center line. This wide cross section provided borrow areas immediately adjacent to the road with the double advantage of short hauls and reduction of backslopes. At one area for a distance of 1,500 feet along the roadway, special easements were obtained to permit the

working of a borrow area 150 feet from the center line on one side and 75 feet from the center line on the other side.

Compaction and Backfill

Although much of the fill came from (Concluded on next page)



CONFIDENCE...how much is it worth



of years, stood as a silent testament to his confidence in a principle of bridge building which, in that day, was looked upon with considerable misgiving.

How much is this confidence worth to bridge engineers, and to humanity as a whole, today?

Had it not been for his confidence there would have been no Brooklyn, George Washington nor Golden Gate Bridges. Had it not been for your confidence in the company that bears this pioneer's name, there could have been no John A. Roebling's Sons Company.

Your confidence is valued above all of this company's assets. Every Roebling employee's job depends upon his ability to preserve that confidence by producing better products and by giving you better service than you can find elsewhere.

Any product is only as good as the organization that makes it.

For the Right Rope for Your Equipment Choose a "Blue Center" Steel Wire Rope!

It's easy to find the right wire rope for your job when you can choose from a wide range—the one construction, size, and grade of steel that will give you most service at lowest cost.

That's why, whatever you need in wire rope, you're sure of finding it in Roebling's complete line of "Blue Center" Steel Wire Rope, in either preformed or non-preformed types. Illustrated are just a few of the more commonly

used constructions. Each is the finest we know how to make... and each is made of Roebling's famous "Blue Center" Steel.

Your Roebling Field Engineer has the broad knowledge and experience needed to help you select the wire rope that will give you greatest returns in dependable, low-cost performance. He's at your service. Call him at our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY

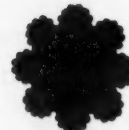
TRENTON 2, NEW JERSEY

Branches and Warehouses in Principal Cities

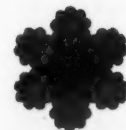
Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems • Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts • Electrical Wire and Cable • Suspension Bridges and Cables • Aircord, Aircord Terminals and Air Controls • Lawn Mowers



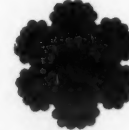
6 x 19 Standard Hoisting Rope



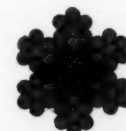
8 x 19 Extra Flexible Hoisting Rope



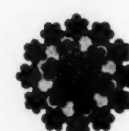
6 x 19 Haulage Rope



6 x 30 Flattened Strand Rope



6 x 7 Standard Coarse Laid Rope



18 x 7 Non-Rotating Hoisting Rope

ROEBLING

A CENTURY OF CONFIDENCE





C. & E. M. Photo
Construction Superintendent for Brown & Leguil on its 3.8-mile Minnesota grading project was Kenneth Kerns of Eagle Lake. He is a veteran of Aleutian construction operations.

Frostboil Prevention Feature of Road Job

(Continued from preceding page)

side borrow, there were cuts along the project; one long though fairly shallow cut of 21 stations involved 45,036 cubic yards of excavation. In all cuts, scrapers excavated 1 to 2½ feet below the profile grade and the area was backfilled with selected material. This fill of selected material was thoroughly compacted with the sheepfoot rollers to provide a stable subgrade.

Over the many areas on the old highway where frostboils had developed and where unstable subgrades were encountered, the grade was excavated to a depth of 2½ feet and the area backfilled with selected material. These sections again were given the compaction treatment with the sheepfoot rollers.

A course of 4,760 cubic yards of gravel stabilized in place was spread over the new grade to provide a temporary wearing surface until a permanent-type surfacing can be laid.

Personnel

Brown & Leguil employed an average of 24 men, working a 10-hour shift 6 days each week. Work was started on August 6, 1946, with 60 working days specified for completion of the project. Wet fall days both hampered and delayed operations.

The project was under the supervision of R. C. Deegan, Mankato, Project Engineer for the State Department of Highways, of which F. D. Minium is District Engineer. Kenneth Kerns, Eagle Lake, was Construction Superintendent for the contractor.

Access Roads to Oil Built in New Guinea

Civilian construction has been resumed in New Guinea. This island group, an oil-producing region, is again being opened up by road builders.

A number of oil wells were in production at the beginning of World War II, but all installations were destroyed either by the Dutch, or by the Japanese during their occupation. However, a contract has recently been awarded by the N. V. Nederlandsche Nieuw Guinea Petroleum Maatschappij for the construction of two piers and approximately 100 kilometers of roads in the dense jungle country of western New Guinea. These roads will give access to new drilling grounds in the territory.

The contract was awarded to F. H. McGraw & Co., an engineering and construction firm of Hartford, Conn. It will be handled by its subsidiary, F. H. McGraw & Co. of the East Indies, under the direction of C. B. Hall.

Advance crews of the construction company are, at the present time, in New Guinea and Morotai, which will be used as a base or trans-shipment point for personnel, equipment, and supplies. Morotai is the island which was used by

General MacArthur's forces as a base of operations for the invasion of the Philippines.

Western New Guinea is sparsely populated, mainly by Papuans, and means of communication and transportation are scarce. The oil company and the contractor plan to use three Catalina flying boats to maintain coordination between the widely separated parts of the work. These will be supplemented by shallow-draft boats and native craft on the rivers. The scarcity of shipping and transportation, together with the great distances from points of supply, creates the most difficult problem for the contractor in the execution of this work.

When full-scale operations are under way, nearly 60 Americans and

approximately 800 natives will be employed on the project. F. H. McGraw & Co. of the East Indies will install its own camps, with sanitation and medical facilities. It will make full use of the experience of the Army Medical Corps in New Guinea during the last war, and of the Dutch Government and oil-company physicians who have a long and intimate knowledge of conditions in the Dutch East Indies.

Valve-Grinding Aids

A new valve refacer and a valve-seat grinder have been announced by Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill., maker of the Thor line of portable electric and pneumatic tools.

Features claimed by the manufacturer for the Thor valve refacer include dual electric-motor design, sturdy slide rods, and solid balanced construction. Another feature is the Thor "4 in 1" butt-end grinding attachment; it provides, as a unit, settings for four separate operations: grinding the rocker arm, tappet, and valve stem, and dressing the wheel.

The valve-seat grinder is a 5¼-pound tool, electric-driven. It has a cushioned-design feature introduced to provide positive automatic precision with a minimum of operator control, says the manufacturer. Accessories include a Thor wheel dresser, pilots, wheels, etc.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 15.

Operators know it!

Dynamometer tests prove it!

LaPlant-Choate scrapers load 25% easier!



Gain an extra load every four trips!

Here is positive proof of how you can reduce loading time and gain extra pay-yardage with modern LaPlant-Choate scrapers. In recent field tests conducted with dynamometers, other leading scrapers required a full pound of drawbar pull for every pound of dirt loaded into the scraper bowl—while on the same tests modern LaPlant-Choate scrapers averaged a pound of load with only ¾ pound of pull. This LaPlant-Choate saving of 25% in loading naturally means extra yardage at lower cost. And especially on short hauls, it can often mean an extra "bonus load" every four trips—plus additional savings in tractor operation and maintenance.

Add to these facts, LPC's job-proved advantages in hauling and spreading and it's easy to see that—no matter what kind of scrapers you are operating now, you'll be money ahead by replacing them promptly with modern LaPlant-Choate units. Fortunately, too, you won't have to wait because LPC scrapers in most sizes (from 2 to 14 yards struck measure) are ready for immediate delivery. So don't delay. Contact your nearest LPC dealer today and let him show you how you can reduce costs and increase profits with easier loading, faster spreading LaPlant-Choate scrapers. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, California.

and Here's Why!

Low, wide bowl insures bigger loads with less power.

Less weight per yard of capacity.

Modern, open-top design for easy loading by shovel or dragline.

All working force concentrated at center of gravity for easier, more efficient operation.

Bowed offset cutting edge insures better penetration, keeps earth boiling up through center of bowl.

Balanced weight distribution with big tires—completely interchangeable front and rear.

LaPLANT CHOATE

Positive FORCED EJECTION SCRAPERS

FIRST in Value because they're FIRST in Performance!



One man can operate this new Model LLH-2 Hydrauger horizontal earth-boring tool.

Earth Borer Drills Horizontally 50 Feet

A new horizontal earth-boring tool light enough to be operated by one man is announced by the Hydrauger Corp., Ltd., 116 New Montgomery St., San Francisco, Calif. The Model LLH-2 is reported to be straight-boring for underground distances up to 50 feet. It was expressly developed for running in pipe leads.

Power is provided by a 3.2-hp motor operated by 90 pounds of air pressure. The pilot-bit hole of 2-inch diameter can be opened up by reaming to 3½ and 4½ inches. Boring-bar sections are 2 feet in length and weigh 5 pounds each.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 42.

New High-Pressure Multiple-Spot Welder

A new development in automatic multi-spot resistance welding machines has been announced by Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich. Embodying the Progress-O-Matic principle, it may be classified as an automatic multiple-spot welder operated and controlled by high air pressure.

In addition to its high speed of operation, the machine is said to be able to weld different thicknesses of metal requiring variable welding times, heats, and speeds. This is accomplished by controlling the actuation of the individual spot welds by different guns. The machine can handle up to sixty guns; this is said to permit combining a wide variation of long or short welds without penalizing the complete machine cycle to accommodate the longest welds.

Current is supplied by a single water-cooled transformer to all the guns. The high air pressure required to operate the Progress-O-Matic at high speeds is provided by a compressor of the super-imposed-piston type, built by the Power Plus Co. of Detroit. The compressor is driven through a 5-hp ac motor and develops up to 1,000-psi air pressure.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 89.

Rocker-Shoe Steel Bridge Support Is Being Tested

A series of tests has begun at the Technological Institute of Northwestern University to determine the exact amount of steel necessary for safe construction of a commonly used type of steel bridge support. The support being studied is a rocker-shoe type for a 150-foot bridge span. The units used in the tests were built by the Bethlehem Steel Co. for the Chinese Government.

In the test, a steel support is placed in a giant transverse-universal press and subjected to a pressure of more than 500,000 pounds, which has been determined as the span's maximum load. Stresses are measured in all parts of the

slab by electrical wire gages attached to 180 steel blocks 2 inches square; each block measures the stress in its area.

In use, the shoe's weight shifts, as it rocks, on a supporting steel slab which must be thick enough to prevent cracking of the underlying concrete abutment.

The tests for it were devised by, and are under the direction of, Maurice B. Lagaard, Associate Professor of civil engineering at Northwestern.

Gardner-Denver Officers

Edgar F. Schaefer was elected President and H. G. Myers became Chairman of the Executive Board at the annual stockholders' meeting of the Gardner-Denver Co., Quincy, Ill. Mr. Schaefer, formerly Executive Vice President, has been with the company since 1919. Mr. Myers, formerly company President, takes the post which the late J. W. Gardner held. He joined the company in 1927 as Chief Engineer, and became President in 1935.



ASPHALT CUTTERS

MOIL POINTS

GADS

DIGGING CHISELS

Dallett's Contractor Tools

The utmost service can always be expected of Dallett Contractor Tools. They are made by Master Craftsmen of forged products, using the highest possible standards for quality.

Write for Bulletin C-220

TOOL MAKERS

PNEUMATIC
DALLETT
EQUIPMENT
ACCESSORIES
SINCE 1883

THE DALLETT COMPANY

MASCHER AT LIPPINCOTT STREET, PHILADELPHIA 33, PA.
Manufacturers of Pneumatic Tools and Accessories

DISTRIBUTORS in principal cities throughout the United States, Canada, Europe and South America.

Cedarapids
Built by
IOWA

Cedarapids Unitized Plant
the **All-Purpose Portable**
Crushing, Screening and Washing Plant

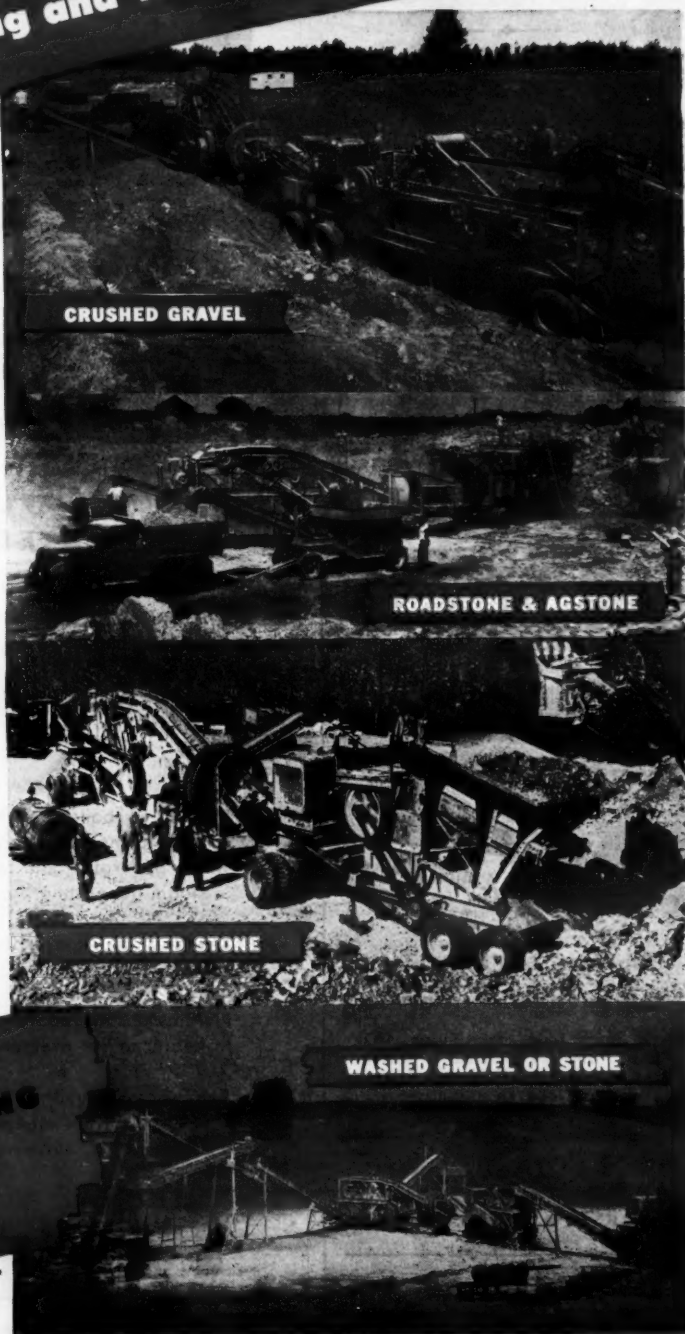
Be wise—Unitize! You'll get a lower cost per ton because here is complete flexibility of setup for any and every job in the crushing field. Completely portable, adaptable to rock or gravel, produces the required number of finished sizes of aggregates, washes all or part of them when necessary, loads quickly into trucks or bins, travels over any road and can be set up right now and get to work immediately. With a Unitized Plant you can do a better and quicker job wherever aggregates are required and at a lower cost. Wide range of sizes to suit every contractor's requirements. When you buy a crushing plant, buy the best—buy Cedarapids. See your nearest Cedarapids dealer for all the facts.

THE IOWA LINE

of Material Handling Equipment Includes
ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS • STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS • TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS



IOWA MANUFACTURING
COMPANY
Des Moines, Iowa, U.S.A.





The new Buffalo-Springfield 12 to 18-ton 3-axle tandem roller has a shortened wheelbase for added maneuverability and widened rolls to give increased rolling width.

Tandem 3-Axle Roller

The development of a new 3-axle tandem roller to be known as the KX-25 has recently been announced by the Buffalo-Springfield Roller Co., 1218 Kenton St., Springfield, Ohio. All the latest improvements in the Model KT tandems will be incorporated in this machine.

The KX-25 will have an approximate metal weight of 12 tons, and a ballasted weight of 18 tons. The wheelbase will be shortened to give added maneuverability, while the rolls will be widened to give increased rolling width.

A limited number of the new model, which will be the only 3-axle model produced by Buffalo-Springfield in 1947, will be on the market in time for the current paving season.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 44.

Dispenser and Salt Pills

One of the most effective means of fighting heat fatigue is through the regular use of salt tablets. To encourage this practice, it has been found handy to have salt-tablet dispensers located in easily accessible spots—preferably where drinking water is dispensed. A folder describing its line of dispensers and salt tablets is now available from the Standard Safety Equipment Co., 232 W. Ontario St., Chicago 10, Ill.

The Sta Safe metal dispensers are made in 600 or 1,500-tablet sizes, while the Fairway plastic dispensers are available in either 350 or 1,500-tablet size. The company can supply standard salt tablets, or a special tablet with

an enteric coating to prevent too rapid absorption of salt into the body channels.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 41.

Grinding Attachment Designed for Lathes

An electric grinding attachment for use on lathes and other machine tools has been developed by the South Bend Lathe Works, 114 E. Madison St., South Bend 22, Ind. It is available with frame sizes to fit the various sizes of South Bend lathes, and it is said that this attachment can be adapted to fit other makes of lathes and shop power tools.

Designed for external grinding, it is powered by a constant-speed continuous-duty 1/4-hp motor. The grinding wheel is 1/2 x 4 inches. The spindle runs on pre-lubricated sealed precision ball bearings. Tension adjustment is provided for the V-belt which connects the motor with the grinding-wheel spindle. Both the grinding wheel and the V-belt are enclosed in a single guard.

Grinding wheels are available in several grades for grinding various materials. Accessories include spring stops for grinding straight and spiral fluted

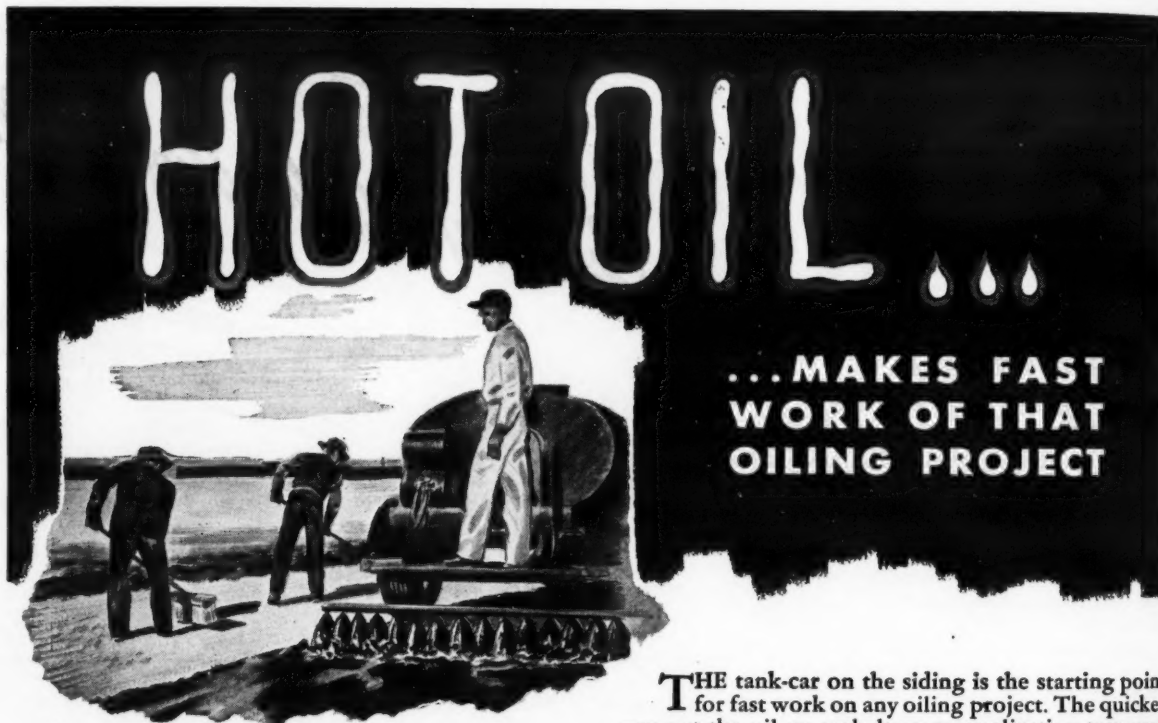
reamers and cutters, diamond dressers for truing the grinding wheel, and holding fixtures for the dressers. Special cup wheels are supplied for reamer and cutter grinding.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 9.

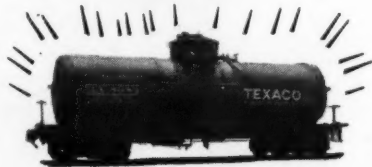
Dealers Serve Montana

Two dealers to cover western Montana have been appointed by the Pioneer Engineering Works, Minneapolis. Central Machinery Co. of Great Falls will serve the north central part of the state, and Wortham Machinery Co., Billings, the south central. These companies have succeeded the Connelly Machinery Co. of Billings, upon its withdrawal from active business.

Both firms will carry the complete line of Pioneer Continuflo equipment consisting of crushers, screens, feeders, conveyors, gravel plants, rock plants, and washing plants for the pit, quarry, and asphalt-paving industries.



**GET HOT OIL—
FAST—WITH LESS
WORK—FUEL—
WATER**



Not just a "boiler on wheels" but a rugged, compact, highly perfected steam generator built by specialists in steam generating equipment.

★
The only tank-car heater with the fuel-saving four-pass flue travel construction. No water problem — full condensate recovery and return to heater under pressure.

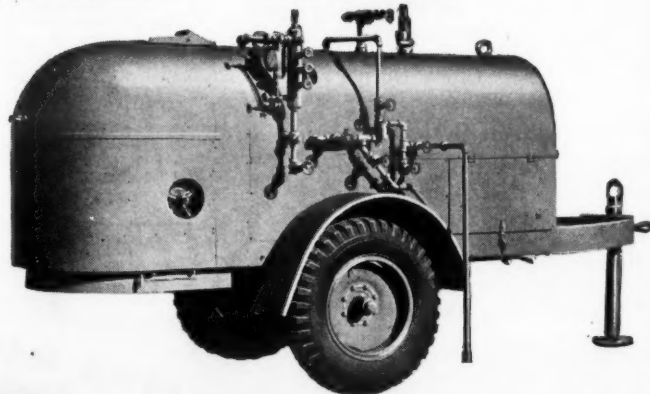
★
An all-purpose unit—provides steam wherever and whenever needed — for heating, thawing, cleaning.

THE tank-car on the siding is the starting point for fast work on any oiling project. The quicker you get the oil or asphalt up to application temperatures and flowing into the distributors — the faster your road crews can get going.

With a Cleaver-Brooks tank-car heater you have hot dry steam flowing to the car coils from a cold start in 20 minutes or less. And you can keep going all day with the least work and bother because a Cleaver-Brooks tank-car heater asks less in fuel and water. The famous and exclusive four-pass flue travel means low fuel consumption; the turbine type condensate return system cuts water loss — every drop of condensate goes back to the heater under pressure. ... Built for full capacity — full-time work — Cleaver-Brooks tank-car heaters will give you the most in production hours on the job. Wherever in service, Cleaver-Brooks are usually given the tough jobs because of their known reliability. ... Write today — get full information from Cleaver-Brooks — the pioneers and originators of tank-car heaters and bituminous boosters.

CLEAVER-BROOKS COMPANY

5110 North 33rd Street • Milwaukee 9, Wisconsin



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PIONEERS AND
ORIGINATORS OF

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS



**COFFING
HOISTS**



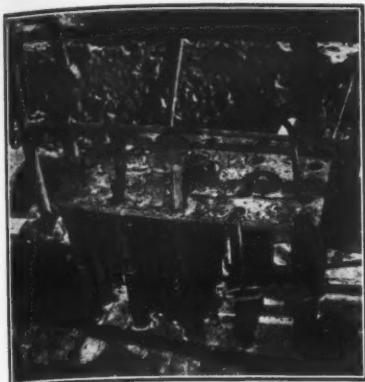
"Safety-Pull" Hoist Pulling Concrete Forms

**Contractors - Engineers
Superintendents - Foremen**

Have long been specifying COFFING "SAFETY-PULL" Ratchet Lever Hoists for all kinds of lifting and pulling jobs in their construction and maintenance work. These light weight, portable time and labor saving hoists are built in capacities ranging from 1/4 to 15 tons yet they weigh only 14 to 150 pounds.

WRITE FOR BULLETIN SR-3.

**COFFING HOIST CO.
DANVILLE, ILLINOIS**



This portable tool rack, of pipe sections welded between perforated steel plates, was contractor-built to reduce time lost in looking for tools and to cut down on unauthorized "borrowing".

Portable Rack Helps Preserve Hand Tools

A tool rack designed by a contractor has proved of help to reduce time lost in looking for tools and to cut down on unauthorized "borrowing". The unit provides a simple convenient storage rack which displays the tools so as to speed up choice of desired size or type.

It consists of two sections of perforated steel plate, 28 x 48 inches in size. Between these are welded four ranks of 2-inch pipe and, across the center, a row of 2½-inch nipples. The 2-foot-long pipe nipples form sockets into which may be dropped handles of wrenches, hammers, and other hand tools. The working faces or jaws of the tools are kept clear of other contact and out where they can be readily recognized or inspected.

The upper plate is, of course, cut out with a torch to the inside contour of the pipe nipples, while the base is left intact. The original perforations afford sufficient drainage to keep the upright nipples clear of water.

A swiveled loop is attached at the center of the upper plate. It provides means of lifting the rack with its stored tools intact. The rack can be picked up by a winch truck and set down again wherever the work requires a set of hand tools.

The perforated base is wide enough to afford ample support on sandy soil or even in mud. But a pair of planks, laid before lowering the rack, will help keep the tools clean and in condition for immediate use.

LeTourneau Staff Changes

Several changes in personnel have been announced by R. G. LeTourneau, Inc., Peoria, Ill. The new Manager for the Installation Department will be R. C. Lewis. This department is devoted primarily to the economics of earth-moving, and is available for consultation and service. Another addition to the department is Keith Thompson, who has been made Applications Engineer.

O. A. (Jack) Williams has been appointed Western Sales Manager with headquarters at the company's Stockton, Calif., office. He will assist distributors in seven western states. E. M. Ferguson, formerly Western Sales Manager, has been appointed Eastern Sales Manager. His office is located at 1026 17th St., N. W., 412-413 Defense Bldg., Washington 6, D. C.

The company's Central Sales Office has been moved from Peoria, Ill., to Kansas City, Mo. The new address is Suite 616, City Bank Bldg., 18th and Grand Sts., Kansas City. W. B. (Bill) Worden, Central Sales Manager, supervises sales and service activities in eighteen midwestern states.

C. D. Fey, formerly Industrial Sales Representative for the western United States, now serves in that capacity for the entire country. He will have his headquarters at the Peoria, Ill., plant.

Announced at the same time are plans for the sale and distribution of the new

Tournalayer. The Tournalayer Sales Division will be under the managership of Richard L. LeTourneau. It will be established at Longview, Texas, where the concrete-house building machine is being produced. Inquiries for specific sales information should be addressed directly to the Tournalayer Sales Division, R. G. LeTourneau, Inc., Longview, Texas.

ASTM Building Dedicated

The headquarters building of the American Society for Testing Materials, made possible through gifts of its members, was formally dedicated at exercises held recently. Located on Philadelphia's Parkway at Logan Square, the four-story structure was presented on behalf of the membership by the organization's senior living Past President, Dr. G. H. Clamer, to its present President, Arthur W. Carpenter. Architect for the building was Sylvester L. Smith, and the general contractor was William D. Baker.

Model Parts Department

To show its dealers what it considers important features of effective parts merchandising, the Detroit Diesel Engine Division of General Motors Corp. has opened a model parts department at the Detroit factory. The plan of the department is designed so that it can be duplicated in a space as small as 1,000 square feet without sacrificing any

of the important characteristics, according to company officials.

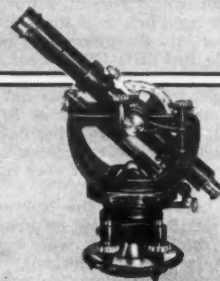
Sales and customer appeal are aimed at through the use of colored panels which cover up bare metal bins. Bin openings are schematically arranged so that correlated parts are stocked closely together, whenever possible. Approximately 900 bin openings are provided in addition to floor storage space for larger material.

Order Now! MAKE SURE OF EARLY DELIVERY

UNIVERSAL LEVEL-TRANSIT

Latest, improved model. Telescope 12" long, 25 power — Horizontal Circle 4½" with vernier to 5 minutes — Vertical Arc 3".

Instant change-over from Level to Transit. Most practical all-around builders' instrument ever designed. Write for full details.



DAVID WHITE CO.

305 WEST COURT ST.
MILWAUKEE 12, WIS.

Manufacturers of Instruments for Engineers, Surveyors and Builders.

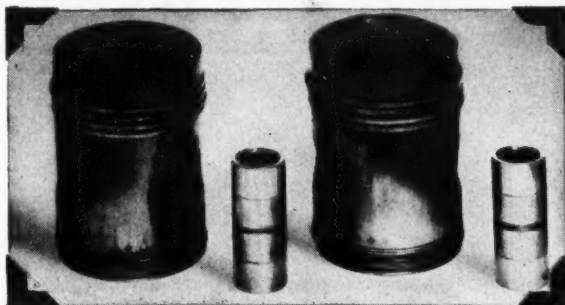
STANDARD ENGINEER'S REPORT



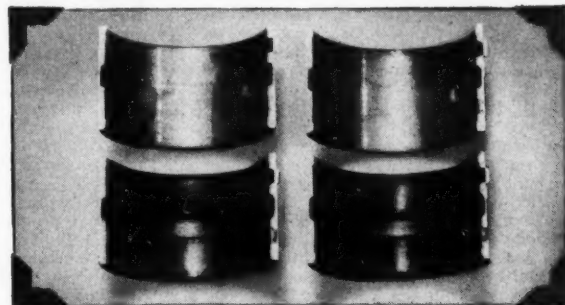
DIESEL BUS ENGINE RUNS 234,539 MILES ON RPM OILS
WITHOUT REPLACEMENT OF ANY PARTS

TEST DATA

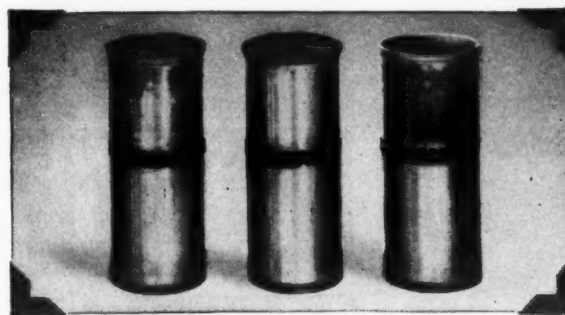
UNIT	<i>G.M.C. Diesel 6-71 #6711367</i>
LUBRICANT	<i>RPM Delo oil SAE 20 and</i>
<i>RPM Heavy Duty motor oil SAE 30</i>	
MILES RUN	<i>234,539</i>
FIRM	<i>L.A. Motor Coach Lines</i>
LOCATION	<i>Los Angeles</i>



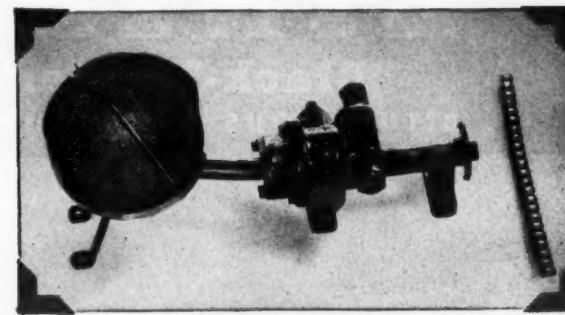
These pistons and pins came from a bus engine operated in city service for 234,539 miles on RPM Oils. As this photograph shows, they were unscratched and rings generally free. RPM Oils keep parts clean.



No cracks, pits or scoring appeared on main or connecting rod bearings. The highest wear measurement on any con rod journal was .0008"; on any main journal .0012". RPM Oils are non-corrosive.



All cylinders were smooth and varnish-free. Measurements on each showed wear from none to only .0035" near top of No. 4. No. 1 was .0013" out of round. RPM Oils stick on parts running or idle.



The oil-pump screen was clear of sludge and other foreign matter. RPM Oils are highly oxidation-resistant. Any sludge or loosened varnish and lacquer stay suspended and drain out with the oils.

REMARKS The test on RPM Oils ended at 234,539 miles without bearing failure or piston seizure. (The longest run on any other oil before failure was 177,000 miles.)

RPM DELO Diesel Engine Lubricating Oil SAE 20 was used for the first 66,000 miles of the test, RPM Heavy Duty Motor Oil SAE 30 for the last 168,539 miles. Both of these oils contain special compounds which clean varnish, lacquer and sludge from engine parts, prevent corrosion, resist oxidation and keep lubricant on hot and cold spots alike.

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

What Is the Contracting Power of the Public Body?

Any contractor who undertakes public construction work without thoroughly canvassing the legal power of the public authorities to enter into the agreement, is riding for a possible bad fall. Often there are constitutional and statutory provisions which may be so fatal to ignore that not one of those recently despised iron pennies can be collected on a \$1,000,000 job. In other cases, there may be a right to collect the reasonable value of work done, provided it does not exceed the contract price.

In a recent case, the Nebraska Supreme Court clarified the law on important phases of this subject, in line with what the courts of many states have decided.

(Warren v. Stanton County, 22 N. W. 2d 287.)

Warren lost a suit to collect on bridge warrants that had been issued by a Nebraska county in violation of constitutional and statutory debt limits of counties. (One of the statutes provided that warrants issued without funds being available for their payment "shall not be chargeable as against the county, but may be collected by civil action from the county board making the same, or any member thereof." The words "may be" seem to have been used advisedly by the Legislature.) Said the court:

"The contention made that this interpretation [that warrants issued in violation of constitutional and statutory debt limitations are void] works a hardship and is offensive to a sense of justice is not without its appeal, but it must be remembered that those dealing with a county are presumed to know, and in fact may readily examine and find out the restrictions and limitations under which the right of contract may be exercised by it, and the fiscal condition is a matter of public record. Therefore, the failure to know the law and the true financial condition of a county is not a matter to consider in circumstances such as are presented by this case."

But the court, in line with many other courts, distinguished between a contract which is beyond the power of a public board to make and one which it has power to make, but does so irregularly. In the latter case, the public body is liable for the reasonable value of what it has received and retains, although it is not liable for the contract price.

The court instanced a case where an equipment company was held entitled to collect the reasonable value of road machinery sold to a county, (although it was not liable on the contract for its purchase) where the irregularity existed in mere anticipation of tax collections after a proper budget estimate had been made. (Omaha Road Equipment Co. v. Thurston County, 238 N. W. 919.)

There is probably no phase of a contractor's business in which he so definitely needs highly competent local legal counsel as in making sure that a prospective public contract will be enforceable. There is little comfort in finding that he has muddled through to the extent of being able to recover reasonable value for services or materials furnished, if it takes protracted litigation to determine that he is entitled to that much.

Rights of Material Men On Federal Construction

One of the most frequent subjects of judicial interpretation in the field of Federal construction contracts is the Miller Act (40 U. S. C. A. secs. 270a-270-d). It requires that before contracts are entered into for "the construction, alteration, or repair of any public building or public work of the United States" at a cost of more than \$2,000, the contractor shall give a bond for the benefit of "all persons supplying labor or material in the prosecution of the work."

Interpreting the law as to the rights of material men, United States District Judge Yankwich lately declared in a bankruptcy proceeding against a contractor, In re Flotation Systems, Inc., 65 Fed. Supp. 698:

"They are protected under it by having the contractor's bond with the Government inure to their benefit, provided they give notice to the contractor, and not to the Government, or to the surety. The aim of the notice is merely to enable the contractor to withhold funds in case a material man has not been paid. . . . However, the Act does not create a lien in favor of the material man upon any unpaid funds in the hands of the public body for whom the contractor performs the work. It merely protects them by giving them certain rights under the bond. The bankruptcy of the contractor does not destroy the surety's liability."

Association Dues Upheld: Based on Business Done

Dues to be paid by members of a local contractors' association were based upon a small percentage of business done by each. This fact did not make the arrangement void as tending to stifle competition in bidding on contracts. So decided the Illinois Supreme Court in the case of Electrical Contractors Association of Chicago v. A. S. Schulman Electric Co., 391 Ill. 333, 63 N. E. 2d, 392.

The Association had brought suit to recover a deficiency of dues paid. The Electric Co. unsuccessfully defended the suit on the ground that provision for payment of dues based on 4/10 of 1 per cent of business done was void as being against public policy. The Supreme Court said:

"To adopt such a conclusion is to assume that dues paid will, in the course of time, be

distributed to the members in the form of dividends. There is nothing in the constitution or bylaws to support this assumption. It is a nonprofit corporation, and the accumulation of money or the division of it in form of dividends to the members is not provided."

This decision was influenced by evidence as to the principal purposes of the association: to promote the welfare of members by providing statistical data, furnishing expert

advice in matters pertaining to the trade generally, etc. In this connection the court quoted from a report of the Secretary of Commerce which commended association cooperation to eliminate waste in production, to increase education as to better methods of business, to take collective action in policing business ethics, to secure adequate representation of problems before the Government, to negotiate collectively with organized

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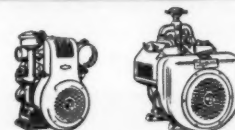
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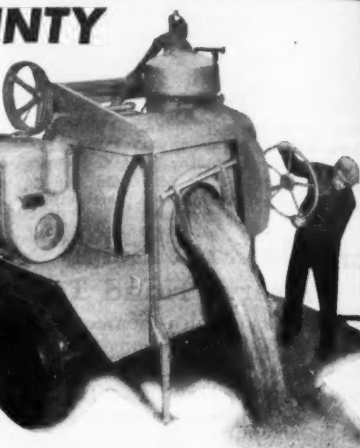
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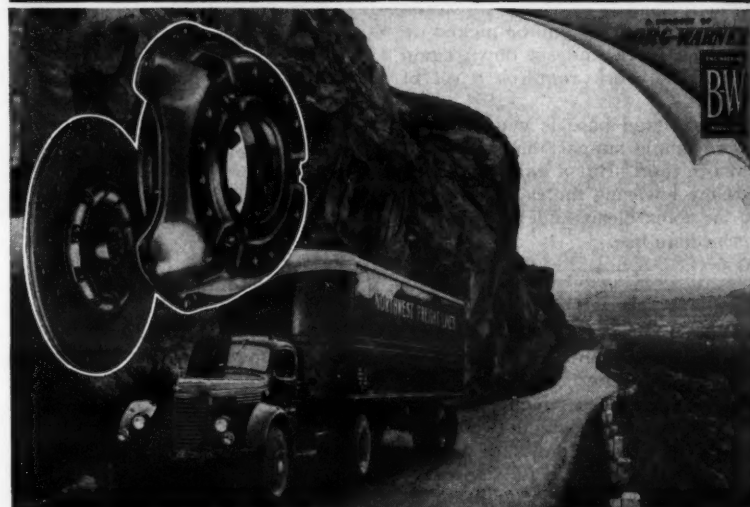
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Avoid Legal Pitfalls

(Continued from preceding page)

labor, etc.
The Illinois court declined to follow reasoning of the appellate courts of Kentucky, Wisconsin, and Pennsylvania, in which similar provisions for dues were held to be contrary to public policy. Said the Illinois court:

"The case of *Kentucky Association of Highway Contractors v. Williams*, 213 Ky. 167, 280 S. W. 937, 45 A. L. R. 544 . . . was a case where a nonprofit membership corporation of highway contractors brought suit to recover dues under a bylaw which required payment to the association of 1/4 of 1 per cent of all highway work contracted for by a member. The court held that such an agreement created a condition whereby a member would add to his bid the amount he was required to pay the association, thereby collecting from the public the amount he was required to pay as dues. It is our view that unless there is proof that such percentage was added to the contract price, there is nothing that condemns it as being against public policy any more than if the contractor had paid a flat rate fixed without regard to the amount of business transacted. We apprehend that any dues which a member is required to pay at a flat rate would be carried as an overhead charge and would be reflected in the bids made, the same as any other overhead item."

Agreements to Enter

Into Future Contracts

Defendant agreed to enter into a subcontract with a contractor on a future Army air base job. But he breached his contract when the contractor was awarded the job. The contractor's rights to collect damage were litigated before the South Dakota Supreme Court in the case of *Northwestern Engineering Co. v. Ellerman*, 23 N. W. 2d 273. The court decided:

Insistence by either party that the final contract include terms not contemplated when the original agreement was made would constitute a breach of the latter agreement. Likewise refusal to enter into a final contract which was consistent with the original agreement would be a violation.

Where one agrees to take a subcontract for specified work at a specified price if the other party secures a general contract, but later refuses to take it on those terms, the general contractor is entitled to damages. These damages shall be measured by the difference between the price at which the defaulting party agreed to take the subcontract, and any greater sum that the general contractor actually and necessarily pays a third party to do the work. But the defaulting party is not liable for increased cost where such an increase is caused by the contractor requiring the new subcontractor to do work that could not have been required of the defaulting party.

Asphalt-Plant Lessee

Liable for Fire Loss

A highway contractor leased an asphalt plant from the owner. He was liable for its loss when a fire was caused by application of excessive heat to a fuel tank containing water. (*Roselip v. Raisch*, 166 Pac. 2d 340, decided by the California District Court of Appeal, Second District.)

Here are high spots of the court's opinion: It was the lessee's duty to have in charge of the plant an experienced engineer who would know the perils of heating fuel oil and would exercise such care as to test for the presence of water. "The combination of heat, inflammable oil, and steam under pressure was sufficient to arouse the brain centers of caution in an experienced fireman. Such facts required" the lessee "in the exercise of ordinary care to know the attendant dangers and to avoid them."

Awarded Extra Pay

When a Federal housing-project contract was entered into, the specifications showed that \$1.25 per hour was the applicable wage rate for painters. Plaintiff took a subcontract on that basis. Later the defendant, the general contractor, entered into a supplemental agreement with the Government, raising the rate to \$1.40. This was done without consulting the subcontractor, who thereby became bound to pay the higher rate in order to secure labor.

The Washington Supreme Court decided that he was entitled to collect the wage difference he had been required to pay, although the general contract remained unchanged as to the price to be paid by the Government for the job. (*White v. Mullen*, 170 Pac. 2d, 322.)

The Supreme Court reasoned: (1) The subcontractor was not bound by the agreement between the general contractor and

the Government that there would be no increase in the contract price; the subcontractor was not a party to it and did not know that it was being made. (2) The general contractor barred the subcontractor from making any claim against the Government, but could not bar his right to reimbursement by the general contractor for the increased labor cost. (3) The general contractor was in no position to deny liability on a theory that the subcontractor could not have secured labor at less than \$1.40 per hour; for the general contractor created that situation by agreeing to a boost in the rate, without the subcontractor's knowledge or consent.

Damage for Work Stoppage

A state parkway contractor saw a house standing near a construction station; even the plans indicated its presence. These facts, however, did not defeat the contractor's right to damages for stoppage of work until the State cleared the site. (*A. W. Banko, Inc. v. State*, 60 N. Y. Supp. 2d 758, decided by the New York Court of Claims.)

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It sounds good to me and it's proved even better. That Oliver "Cletrac" dealer sure has a lot of ideas that make a job easier. He's a good man to know.

Cletrac

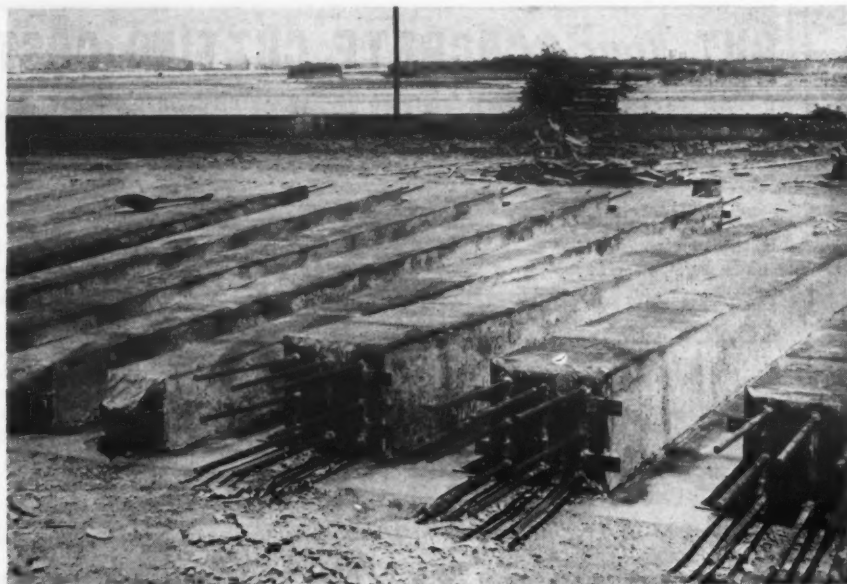
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CONCRETE PILES. As part of the U. S. Engineers' erosion-control program, reinforced-concrete piles were driven along the Kansas City, Kans., waterfront on the downstream side of a curve in the Missouri River. L. G. Barcus & Sons of Kansas City, Kans., was the contractor.



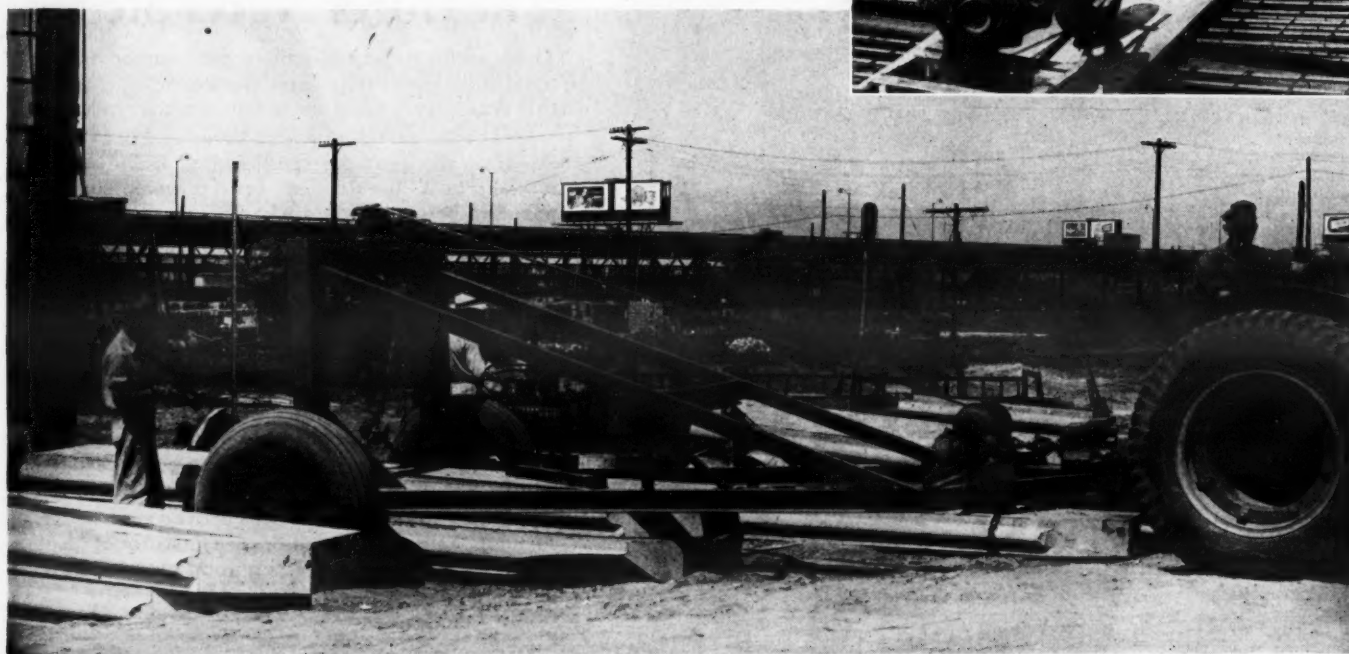
FORM SET-UP. Forms for square piles used on the job were arranged in a fan. Between forms a space was left exactly the pile size and shape. After the steel forms were removed from the first pour, a second was made in these spaces, using the cast piles as side forms and adding simple end forms.



SHEET PILING. For the first time in this midwest area, precast concrete sheet piling was used on this job. The Kansas City District Office of the U. S. Engineers designed the interlocking piles, each 10 x 30 inches x 16 feet. Contractor Barcus made the pile forms shown above.

POURING. Kansas City quarries supplied concrete in truck-mixers for the sheet piling and for the concrete cap poured after the piles were in place. A Mall vibrator was used to provide vibration of the concrete in the forms (see right). The contractor was able to pour 50 such piles in one shift.

Pile Will For Ro

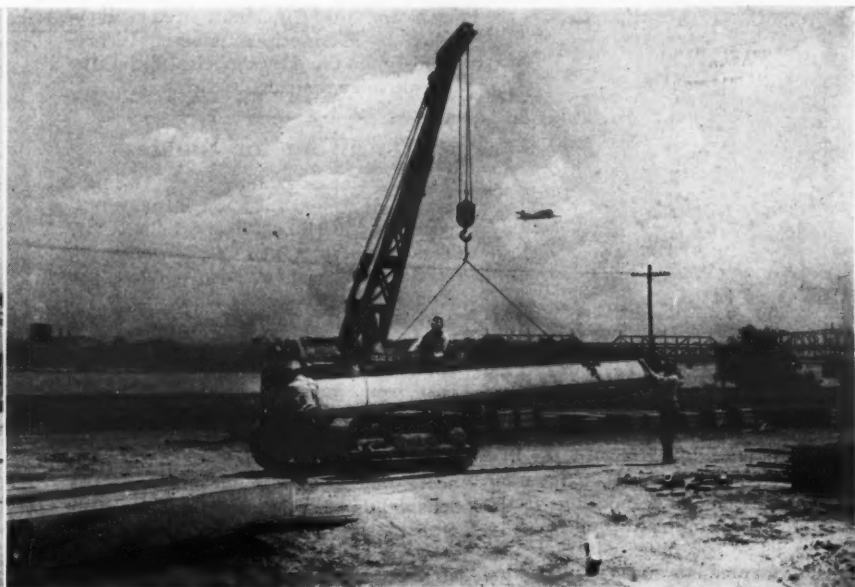


DESIGN. The special interlocking sheet piling was designed to force each pile up against its neighbor as the bevel end was driven into the ground. It shows up clearly in the picture above of workers loading a tractor-towed rig which the contractor built to transport the piling.

TRANSPORT RIG. A pulley was mounted on the U-frame (see right) of this special rubber-tired fast-haul unit, and connected to a winch powered by a drive take-off from the tractor. The pulley raised the piles for transport, lowering them again at the pile driver.



CURING. After the second pour was made in the "fans", curing was speeded up with the use of a curing compound. Meanwhile the original steel forms stripped from the first pour had been set up in a new location and were poured at the same time as the second pour. In this way the contractor doubled form capacity.

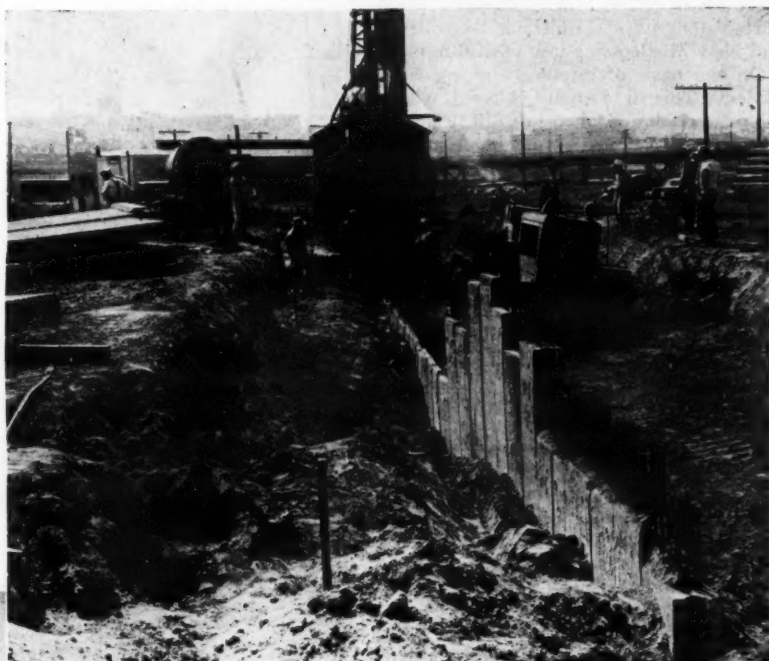


STOCKPILE. When cured, the square piles were moved from the pouring platform to a stockpile by a Hughes-Keenan crane mounted on an International TD-14 tractor. Often these operations had the droning background accompaniment of a plane taking off from the Kansas City Municipal Airport across the river.

Will Is Driven Erosion Control

On a Missouri River Waterfront Job
The Contractor Doubles Form Capacity
For Square Piles; Concrete Sheet Piling
Also Poured and Driven

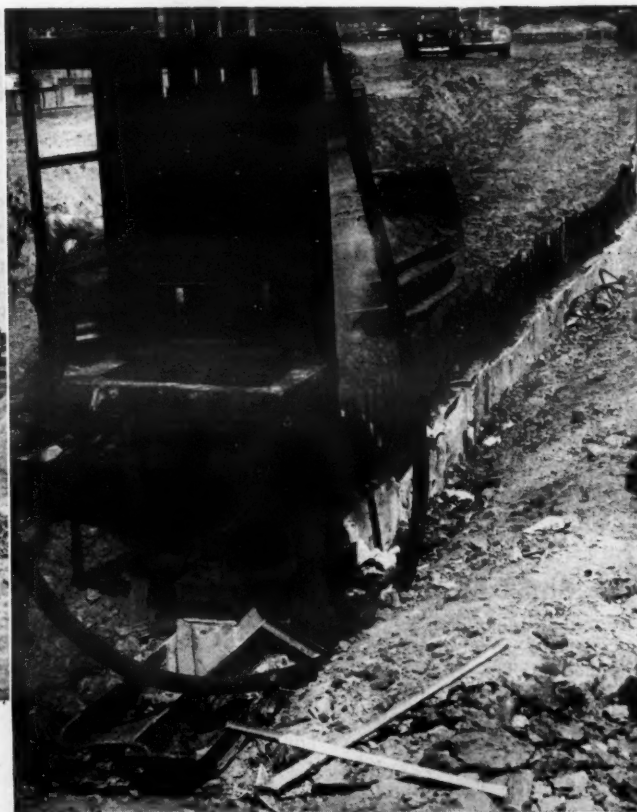
(Blaine S. Britton Photos)

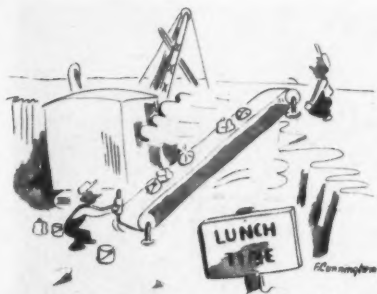


PILE DRIVING. The 16-foot piles were driven to a penetration of 15 feet. About a foot was left above ground with reinforcing bars to extend into the concrete cap which will complete the erosion-control wall. A special jig at the foot of the pile driver (see below) positioned the piles. Two cables were run to it from an International tractor spotted near-by: one, by direct attachment, to push the pile back against its previously driven neighbor; the other, through a sheave on the driver frame, to pull the jig forward to start another pile.



TRENCH EXCAVATION. Meanwhile, at the scene of pile-driving operations, a Marion crane and clamshell excavated a wide trench in which a Marion 1½-yard steam-powered crane with a Vulcan No. 1 hammer advanced to drive the sheet piling. In this picture, the river is to the right and Kansas City, Kans., is in the center background.





Texas Leads U. S. In 1947 Road Work

More than one-fourth of the mileage put under contract in the United States highway-building program for the first two months of 1947 was let in the state of Texas, an official tabulation of the Public Roads Administration revealed recently. The 950 miles contracted in Texas amounted to more than twice the mileage of any other state, and was greater than the total mileage of 38 states.

Of 3,564 miles listed for all states, South Carolina came in for second place with 452 miles. Oklahoma reported 136 miles, Louisiana 32 miles, and New Mexico was low with 6 miles.

On the basis of number and cost of projects, Texas is also out in front, with 145 projects at a total cost of \$10,498,000. West Virginia holds second place as to number of contracts, 77, and South Carolina third place with 58. However, in total cost of projects, Florida holds second place, with \$6,119,000 of work placed under contract in January and February, while California's \$5,033,000 puts her third.

"It's good to know we're out in front again this year," State Highway Engineer D. C. Greer said. "The 214 miles of farm-to-market roads offered for bid in March this year is more than all the combined highway programs of 29 states listed in the PRA 60-day report."

Pointing out that the paved mileage on the state highway system has been increased by more than 1,700 since last September, Greer said that satisfactory progress is being made on nearly \$62,000,000 of outstanding highway contracts.

"This is the biggest dollar volume of again this year," State Highway Engineering Department at any one time in its 30 years of history. Short handed engineering staffs throughout the state are pushing hard to keep the \$174,000,000 road program moving along at a fast pace," he added.

Emphasizing the need for more paved highways to handle sharp increases in post-war motoring traffic, a highway planning survey showed February traffic was 6 per cent above the same period last year, and 11 per cent above the same month for 1941, peak pre-war year for highway travel in Texas.

With 25 district offices scattered over the great highway-building empire, engineers are building highways on the caliche beds west of the Pecos, in the deep light Gulf soils, and across the clays and marls of the northeast corner of the state. Texas has possibly a greater range of soils than any other state in the Union.

While the completion of current work will help to solve the highway problem in Texas, it will not finish the program. "All of this work and more is urgently needed," Greer concluded. "Our highways must be made safe."

Falk Sales Staff Changes

The appointment of Ken O. Hood as Pacific Coast District Manager has been announced by The Falk Corp. of Milwaukee. With headquarters in Los Angeles, he will direct sales in California, Washington, Oregon, Nevada, New Mexico, Arizona, Colorado, Utah, Idaho, and parts of Wyoming.

His former position as District Man-

ager for the Cincinnati area will be filled by Kenneth W. Morrissey, previously in the Los Angeles and Pittsburgh sales districts.

Training for Welders

A booklet describing the curriculum and general organization has been issued by the Hobart Trade School, Inc. The school is a nonprofit organization sponsored by The Hobart Bros. Co., Hobart Square, Troy, Ohio, maker of arc-welding equipment.

Courses offered include arc welding, carbon arc welding, alloy steels and cast iron, helium arc welding, hard-facing, tool welding, stud welding and submerged arc welding, spot or resistance welding, metal spray and oxy-acetylene welding and cutting. The school has been approved by the Veterans' Administration, and ex-servicemen are eligible under the G.I. bill to attend either beginning or refresher courses.

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New Bridge Is Built On Road Relocation

Sharp Curves Eliminated On Approaches; Two-Span Structure Rests on Piles Driven to Ledge Rock

♦ A DANGEROUS section of road that has been the scene of several accidents at the cost of human life has been reconstructed on U. S. 5 near Newbury, Vt. By relocating a one-mile stretch of this highway, steep grades with blind 12 and 15-degree curves on either side of a short, narrow, concrete bridge have been eliminated; thus the chief hazard to safety has been removed. The old bridge, too, has been replaced. The longer and wider new structure has two spans of steel I-beams supporting a concrete deck, and resting on concrete abutments and a center pier. The footings for the substructure are supported on timber piles driven an average of 30 feet to ledge rock.

A contract for this improvement was awarded by the Vermont Department of Highways to R. F. Carpenter, a general contractor from Alburg, Vt. His low bid was \$185,943.75 for construction of the bridge, approaches, and other smaller structures. Work was started the middle of April, 1946. Although the expiration date of the contract is not until this month, the bridge, structures, and approaches were opened to traffic November 27. However, the project was not completed, and work on it was suspended December 7, 1946, until this spring.

The bridge crosses Halls Brook, a usually placid watercourse that empties into the Connecticut River about a mile further east. In flood time, however, the brook becomes a raging torrent; in 1927 and 1936, when the Connecticut backed up, the existing concrete bridge was topped by the waters. The new bridge is 8 feet higher than the original single-span structure, and a further comparison of the two indicates the extent of improvement.

	Old Bridge	New Bridge
Span	One 45 ft.	Two 54 ft. (108 ft.)
Roadway	20 ft.	30 ft.
Clear height	12 ft.	18 ft.
Highway	540 sq. ft.	1,130 sq. ft.
Substructure	Concrete T-beams	Steel I-beams

In addition, the 12 and 15-degree curves on the approaches have been reduced to 3 degrees. The total curvature, as compared with the original reverse curves which totaled 57 degrees, is now only 6 degrees 45 minutes. The relocation is only 5,058 feet long as against 5,893 feet before the improvement.

Substructure on Piles

The job got under way with the excavation being handled by a Bucyrus-Erie 22B crane with a 50-foot boom. On the two abutments a Williams ½-yard clamshell was used; for the center pier, which is located at the north edge of the brook, a Williams ¾-yard dragline bucket was attached.

After the grade of the footings was reached, a McKiernan-Terry 9B3 steam hammer was hooked up to the crane and used without leads to drive the

piles. Steam was supplied by a 25-hp vertical coal-burning boiler. The spruce piles were from 26 to 34 feet long and averaged 8-inch tips and 14-inch butts. A total of 62 were driven, 30 under the center pier and 16 under each abutment.

To act as a guide or template for the piles, since no leads were used, two logs were laid across the footing trench and staked firmly in position. Two ropes were also passed around the top of the pile; a man on each side controlled the ropes to hold the piles in vertical line. These restraints were not needed after the piles had been driven through 3 to 4 feet of clay which composed the upper stratum. The piles were driven to a grade that permitted them to project 12 inches into the concrete footings.

In order to construct the pier footing



C. & E. M. Photo

To the right in this picture is the north-abutment form work R. F. Carpenter set up for the new Halls Brook bridge, and the Jaeger 10-S concrete mixer he used. The footing for the new center pier is in the foreground, downstream from the old bridge.

in the dry, the contractor diverted the stream slightly to the south. He threw up an earth dam around the site of the pier and unwatered inside with a Sterling 4-inch pump. The concrete pier footing is 40 feet 4 inches long x 8 feet 7½ inches wide x 4 feet deep. Each abutment has two footings, 10 feet 8

inches x 7 feet x 4 feet deep, placed on 22-foot centers to support the two columns. Each of these latter footings rests on 8 piles.

Form Work

The pier stem is 38 feet long with a
(Continued on next page)

ALL THE KINDS OF STEEL YOU NEED FOR A HIGHWAY JOB

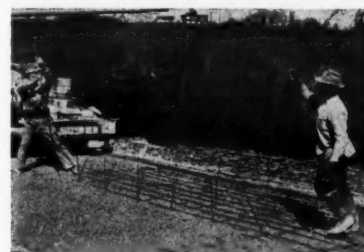
Whenever you need dependable steel for road- or bridge-building, get in touch with Bethlehem. Bethlehem's line of steel products for highways is complete. It contains practically everything you require, from drill steel to guard rail, to complete any highway contract.

You'll find it convenient to order all your requirements from Bethlehem, too, for Bethlehem makes it a point to work closely with contractors. Each order is handled as a unit, with individual items scheduled for delivery when needed.

Shown here are some of the Bethlehem road steel items which you will find giving a good account of themselves in scores of road-building projects during coming months. Complete information is available on request.



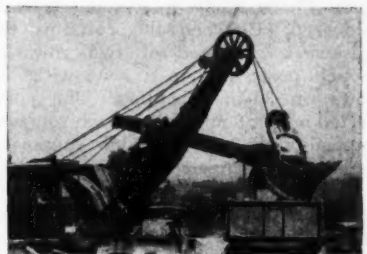
WELDED FABRIC—Bethlehem Electric Welded Fabric is excellent for use in reinforcing concrete roads and pavements. Of square or rectangular mesh, it is made from cold-drawn steel. Comes in rolls or sheets, and in various combinations of wire-spacings.



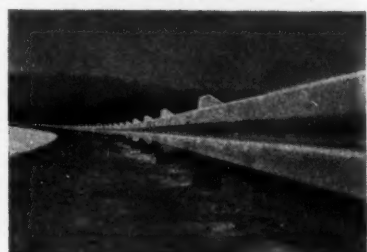
HINGED BAR MATS—An effective means of reinforcing road slabs. Bethlehem Hinged Bar Mat is handled by two men. Folds to about half the standard mat size, making it easy to truck without exceeding road-width limits. Meets state specifications.



DRILL STEEL—Need a tough drill steel for making shot holes? Use Bethlehem Hollow Drill Steel. It stands severe usage, is equally suitable for forged-on bits or detachable bits. Bethlehem also supplies Solid Drill Steel for such items as pinch bars, moil points and chisels.



WIRE ROPE—You can count on A-1 wire-rope performance when you team up with Bethlehem's Purple Strand for shovels, dragline excavators, scraper wagons and cranes. It has exceptionally high resistance to wear and fatigue. For best results use Purple Strand in the Form-Set (preformed) construction.



GUARD RAIL—Bethlehem Safety-Beam Guard Rail affords maximum protection to motorists. Its sections lock together to form a continuous beam, impact being absorbed not by one, but by several adjacent posts. This efficient guard rail comes in lengths up to 50 ft.

Vulcan Tools

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

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35-43 Liberty Street, Quincy, Mass.
Branch Offices and Warehouse Stocks:
74 Murray St. New York, N. Y.
34 No. Clinton St. Chicago, Ill.

LEADING BETHLEHEM HIGHWAY PRODUCTS

ROAD JOINTS	REINFORCING BARS	BAR MATS
GUARD RAIL	GUARD RAIL POSTS	WIRE ROPE
HOLLOW DRILL STEEL	FABRICATED STRUCTURAL STEEL	
SHEET AND H-PIILING	SPIKES	BOLTS AND NUTS
TIMBER BRIDGE HARDWARE		TIE-RODS

STEEL for HIGHWAYS

Bethlehem Steel Company, Bethlehem, Pa.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation



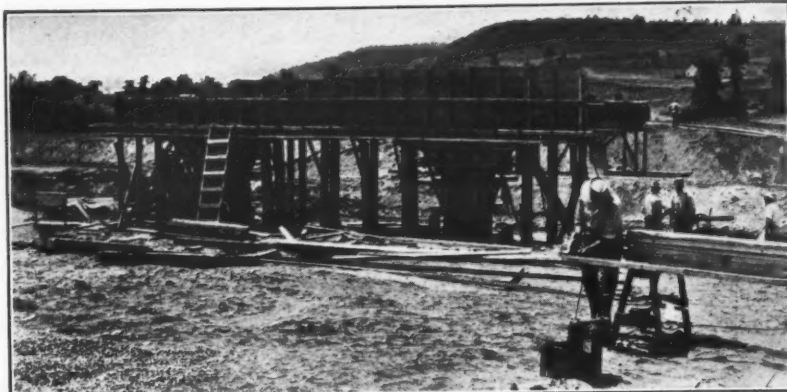
New Bridge Is Built On Road Relocation

(Continued from preceding page)

width of 5 feet 7½ inches at the bottom and 4 feet at the top; the sides have a batter of ½ inch in 12. The pier is 20 feet high. The two columns of the abutments are 16 feet high; at the base they measure 6 feet 8 inches x 3 feet, while at the top they are 3 feet square. The land-side face is vertical, but the other side is battered 3½ in 12. The columns are connected by a concrete beam or cap which cantilevers over the ends for a length of 40 feet and is 2 feet wide x 3 feet deep. On the water side of these skeleton abutments, a 6-foot layer of stone fill was placed on a 1½ to 1 slope; it began 3½ feet out from the edge of the cap and extended down to the water's edge.

Forms for the concrete pours were constructed of ¾-inch butt-end boards of random widths and lengths, and dressed on the side next to the concrete. They were backed by either 2 x 4 or 2 x 6 studs on 24-inch centers. Form ties consisted of ¾-inch reinforcing-steel rods set on 24-inch centers both ways, with Chicago Universal buttons at the ends. Later, when the forms were removed, the buttons were pulled off and the rods burned off flush with the concrete by an oxyacetylene torch. Considerable time was saved by cutting the lumber with a 7-inch-blade electric portable SkilSaw operated by current obtained from tapping a near-by pole line. A transformer was hooked to a pole to step down the current to the required 110 volts.

Form work for the abutment cap was supported on the two columns and also on falsework in the center and at the ends where the cap or beam is cantilevered. Between the columns the falsework consisted of two rows of 8-inch posts, five to a row, with the rows on 30-inch centers. The posts rested on 8 x 8 mud sills. Each row was capped with 2 x 6's which supported three 2 x 6 stringers, on which was laid a ¾-inch board floor. At the ends the falsework was made up of two rows of three 4 x 4's, with the rows spaced 3 feet and the posts 2 feet on centers. Caps, stringers, and floor were similar to the center construction. Both rein-



C. & E. M. Photo

Form construction is shown here for the north abutment of the new bridge on U. S. 5 in Vermont. In the foreground a carpenter cuts form lumber with a 7-inch-blade SkilSaw. Current for it was obtained by hooking a transformer to a near-by pole line.

forcing and structural steel was obtained from the Bethlehem Steel Corp. and shipped to the job from Boston on trailer trucks.

Concreting

A Jaeger 10-S 2-bag concrete mixer was set up alongside the structure being poured, and water for the batches was pumped from the brook by a Gorman-Rupp 2-inch pump. Sand and stone were purchased from Howard Calkins at Lyndonville, Vt. The material was delivered to the job in trucks after a 40-mile haul and stockpiled at the mixer.

Both portland and natural cement were used in the mix. The former came from the Lehigh Portland Cement Co., via the Boston & Maine railroad from Boston, to a siding ½ mile from the bridge which is located at about the mid-point of the improvement. The natural cement was shipped to the same point from the Snyder Rosendale Cement Co. at Rosendale, N. Y. Both cements were in bags and were hauled by truck from the siding to the job. Natural cement was added to make the mix more workable (since less water was required per batch), to impart a more uniform set, and to eliminate future scaling.

The aggregate was loaded by shovels into four or five wheelbarrows and weighed on a Fairbanks beam scale before being dumped into the mixer skip. The batches were discharged into a Heltzel 1-yard concrete bucket and emptied into the forms by the crane. A typical 2-bag batch by weights was as follows:

Portland cement	188 lbs.
Natural cement	38 lbs.
Sand	520 lbs.
Stone, ¾ to 1½-inch	350 lbs.
Stone, 1½ to ¾-inch	350 lbs.

1,626 lbs.

This mix was Class A concrete with a

cement factor of 1.5, and cured with wet burlap for 7 days. Besides the bridge, four other structures of reinforced concrete were included in the project. They consisted of two box culverts, 80 and 180 feet long; two 4½ x 6 cattle passes, 57 feet long.

When the bridge abutments and superstructure were completed, the structural superstructure was erected. It consisted of six 33-inch 125-pound wide-flange beams on 6-foot centers to support a 7-inch reinforced-concrete deck. The structure is designed for an F live loading.

Approaches

Considerable rock was encountered on the approaches of this 1-mile contract, with cuts up to 22 feet which were removed in a single lift. Deep drilling was done with an Ingersoll-Rand auger drill, and the shallow holes were handled with two I-R Jackhammers. Air was supplied from an I-R 315-cfm compressor.

(Concluded on next page)



FINEST DEVELOPMENT In Municipal Paving Units JACKSON ELECTRIC HAND SCREED

with PORTABLE POWER PLANT

FOR MUNICIPAL PAVING OPERATIONS WHERE WIDTH OF SLAB VARIES, STREET AND ALLEY INTERSECTIONS ARE NUMEROUS AND OBSTRUCTIONS SUCH AS MANHOLES, SEWER OPENINGS, ETC., ARE ENCOUNTERED, THIS COMBINATION OF JACKSON EQUIPMENT TOPS ANYTHING PREVIOUSLY USED. And it likewise is ideal for paving HIGHWAY BRIDGE DECKS, HIGHWAY PATCHING and INDUSTRIAL FLOORS. Light weight, easily transported — easily operated by two men.

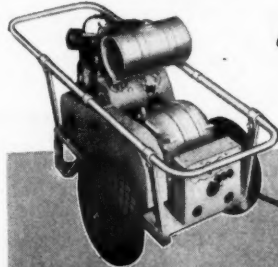
The screed, which tends to propel itself forward, strikes off and places any mix varying from 4" to 1½" slump concrete and leaves the slab surface in ideal condition for finishing with minimum labor. Second pass if required is quickly made. Operators stand on hard ground — not in soft concrete.

THE COMPLETE UNIT CONSISTS OF:

- 1 The Model SC-200A Screed for any width slab as specified from 8 to 20 ft. — activated by the famous Jackson Vibratory motor.
- 2 Jackson Type M-1 Portable Power Plant which provides a wide range of vibratory frequencies thus assuring perfect placement of any concrete mix usually specified. Also ideal for operating flood lights, internal concrete vibrators, drills and any other portable power tools within its capacity.

The JACKSON M-1 Power Plant

Capacity: 1.25 K.V. Generates both single phase and 3 phase 110 Volt 60 Cycle AC power. Husky Wisconsin engine. Permanent magnet generator which has no brushes, rings or other small parts requiring adjustment or maintenance. Trouble-free.



By all means

get the complete facts on this time and money-saving paving unit. Write, TODAY!

For Second Pass or Transportation Along Forms. The Screed is Elevated Clear of Slab.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

Two-Cylinder

The NEW ONAN AIR-COOLED 10 H.P. 4 CYCLE "CK" ENGINE

A new, light, compact, easily-installed engine of wide power range. Completely "De Luxe" equipped, easy-to-get-at controls, and many other plus points. Prompt delivery on early orders.

ONAN ELECTRIC PLANTS—A.C.—350 to 35,000 watts in standard voltages and frequencies; D.C.—600 to 10,000 watts, 115 and 230 volts. Battery chargers—500 to 6,000 watts, 6, 12, 24, 32 and 115 volts. ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 h.p.; 8H: 2-cylinder opposed, 5.5 h.p.; 18: 1-cylinder, 2.5 h.p.

WRITE FOR SPECIFICATIONS

D. W. ONAN & SONS INC.
3460 Royalston Ave. Minneapolis 5, Minn.

ONAN 4-Cycle ENGINES



The new FWD plow for airport snow removal is designed to throw snow 30 to 40 feet to one side without developing banks or windrows. It is shown here working on the Clintonville, Wis., Municipal Airport.

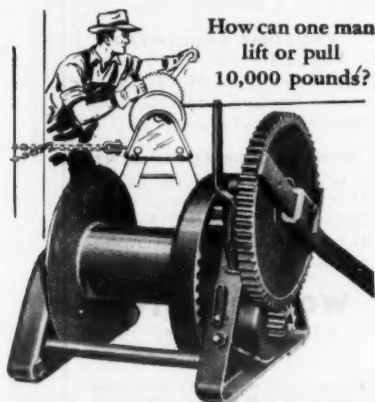
Snow-Removal Plow, Method for Airports

The development of a new plow and technique for snow removal from airport runways has been announced by The Four Wheel Drive Auto Co., Clintonville, Wis. This method employs a special reversible plow designed to throw the snow in a layer of uniform depth for a width of 30 to 40 feet with no windrow at the discharge end.

The system and equipment were developed by J. R. Shannon, Snow Removal Engineer for FWD, to combat the special problems involved in airport snow removal. Strips need to be unusually wide for runways. Banks along the sides will hamper airplane operation, and are apt to slow down snow plows after a heavy storm.

The plow designed by FWD is powered by a five-ton four-wheel-drive truck. It has a moldboard shaped so that snow is picked up by the whole length of the cutting blade and moved in a helical path across the face of the moldboard to the discharge end. Both the radius and curvature of the moldboard and the cutting angle were made large enough to permit snow picked up at the lead point to travel across the face of the plow and be discharged at an angle above the horizontal at the upper trailing corner.

In order to accelerate uniformly the speed of the snow from the lead point to the discharge end, the moldboard section was given a spiral shape. The cutting angle, made considerably greater than that used on highway plows, gives a greater side-thrust. But this is said to be overcome by the fact that power is applied at all times to all four wheels through a free-running differential.



How can one man
lift or pull
10,000 pounds?

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HANDIWINCH

One man, working alone, can lift a truckload of cement... or drag a 5-ton machine... or lower a steel I-beam into place... with the American Hoist HANDIWIND. Weighs only 95 lbs.; can be carried and set up anywhere. Ruggedly built, has cut steel gears. On the market only one year—thousands already in service. Sells for \$75 f.o.b. your distributor's warehouse.

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sipated by propeller blasts and by sun and wind.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 91.

Thermos-Type Kettle For Joint Compounds

An insulated kettle designed specifically for pouring heated asphaltic bituminous material in pavement cracks and expansion joints is manufactured by the Kahl-Kaser Inc., 6450 LeGrand Ave., Detroit 11, Mich. The Butler Crackfiller has a capacity of 1½ gallons.

It is built with one inch of insulation all around in order to prevent the accumulation of cold asphaltic material. This thermos-jug effect is said to maintain the material at practically a constant temperature for several hours. The lid is also packed with this insulation.

As an aid to placing the filler compound, the pouring valve is located

ahead of the container. The rod which controls the valve extends to the handle and can be operated with the same hand which carries the unit. The Butler Crackfiller has an outside diameter of 8 inches, an inside diameter of 6 inches, a height of 25 inches, and a weight of 12 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 40.

Contractors' Tools Listed

Its line of forged tools for contractors is described in Bulletin No. 220 issued by The Dallett Co., Mascher at Lippincott St., Philadelphia 33, Pa. These tools include asphalt cutters, moil points, gads, digging chisels, and tamping tools. The bulletin lists all the sizes and illustrates several types in the line. It also gives complete dimensions for each and lists parts numbers.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 59.

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HEAVY DUTY Diesel

TRACTOR'S POWER

190 HP. MAX. RATING
AT 1300 RPM.
Send for Bulletin 1418

Thermostats control jacket heat.

Glow plug for electric starting.

American Bosch pintle nozzle.

Waukesha combustion chamber, surrounded by water, removes from outside.

High heat concentrates at chamber outlet.

Oil cooler by-pass valve.

One straight side oil control ring.

Oil cooler.

Full length water jackets.

Tell-tale drip passage.

Rifle-drilled oil header.

Outside-mounted oil pump.

Hardened main and connecting rod crankshaft journals. Steel-backed, copper-lead-babbitt precision bearings.

Alloy-steel heat-treated main bearing studs.

Pressure oiled rocker arms.

Twin valve springs and hardened guides.

Controlled turbulence combustion chamber.

Hardened alloy exhaust and intake valve seats.

Cooling oil at piston crown.

Four wedge piston rings.

Tubular push rods.

Oil passage to piston crown.

Hardened cylinder sleeves, removable.

Cooling oil discharge from piston crown.

American Bosch injection pump.

Hardened camshaft, single forging.

Four alloy-steel heat-treated rod bolts.

Oil level equalizer and strainer.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • New York, Tulsa, Los Angeles

Caliche Crushed For Highway Base

Water Control and Skill Vital in the Technique Of Road-Mixing 22 Miles For Smooth Fast Highway

♦ A 22.16-MILE highway contract, all on new location, was recently pushed to completion by Uvalde Construction Co. of Dallas, Texas, for the Texas Highway Department. The new \$379,130 contract makes U. S. 67 fully paved through Texas. It included a crushed-caliche selected base, grading, and a double bituminous surface penetration treatment.

Of special interest is the 6 to 8-inch crushed-caliche base course, which called for a road-mixing technique all its own.

Located about 10 miles west of Fort Stockton, the new cut-off road to Alpine has some features which prove beyond a doubt that Texas still sports pioneer country. The new 22.16-mile section has no access throughout its length. For the entire distance there is only one dwelling visible from the right-of-way.

There was water in that country only at both ends of the job, and well drilling near the center of the project failed to produce results. The cost of obtaining water for the road-mixing of crushed caliche was almost \$2,000 per mile, but water is a part of the secret of caliche processing.

New Highway Design

The design of this new highway incorporates many of the futuristic features for which Texas highways have become famous. Many standard maintenance items were built into the contract. On all high slopes, where rain or snow water might run into roadside ditches or across the embankment, earth dikes were installed with the grading work. These will train the water towards concrete drain structures under the embankment. Grouted-rubble intake aprons were installed to prevent erosion.

On the low side of the embankment, the slope was gently faired down to meet the natural terrain. That will let rain water drain off the shoulders and on down through mesquite-covered rolling plains country.

The new highway has a 30-foot-wide crushed-caliche base, from 6 to 8 inches thick depending on whether the plasticity index of the subgrade soil is over or under 18. A 20-foot double penetration treatment put a 3/4-inch skin on the caliche top. There is no smoother riding surface if the caliche is properly put down.

The new highway is designed to take all automobile and truck traffic in that region for many years.

Caliche Is Tricky!

Name any job problem that Uvalde's Superintendent F. L. Hunter had to whip, and caliche will be at the root of it. Dust was a problem, because caliche naturally crushes down and makes quite a few fine particles. To settle the dust Hunter needed water; in fact, water is as necessary in the processing of caliche as it is in a concrete batch.

If caliche is properly mixed and laid down, with the water content applied evenly during the mix, it will actually hydrate and set up very similar to soil-cement. It will not develop quite that much strength, of course, but it will take on those characteristics.

Once sealed with water and a roller, caliche will shed water well. But scrape that seal with a motor-grader blade and break the surface, and water will run

through the hole and down into the subgrade. If bad segregation of coarse particles occurs in caliche the fill will then be porous, and impossible to seal without slush-rolling.

If too many fines are crowded together with water, then a mushy paste is the result, and the mix has to be aerated.

These are only a few of the tricky properties of this material native to western Texas, New Mexico, and parts of Arizona. But with all its tricks, caliche is one of the best selected base-course materials in the United States, and the road builder who has worked a great deal with the material can solve its problems and make a durable highway. Superintendent Hunter, Assistant Superintendent Sid Milligan, and Resident Engineer E. L. Pearce are all old hands with caliche, and they worked out a nice system of handling the material on this job.

The caliche near Fort Stockton is about 75 per cent lime. Texas Highway
(Continued on next page)



Ready to go !

The 1/2-yd. scoop handles any loose material quickly, economically. Loads into railroad cars or carrying trucks, etc. TRUK-LODER attaches to any standard dump truck whose hoist furnishes lifting power.

Write for more information

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America's Most Complete Line of Material Handling Buckets

Full purpose

- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL



Clamshell
Sizes 3/8, 1/2, 3/4, 1, 1 1/2, 2 yds.

• FRONTS, BOTTOMS, SCOOPS AND TEETH shown in red on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.



Pullshovel
Outside Cutter Widths 26", 31", 36", 39"

On the 1/2 yd. and 3/4 yd. Shovel and Pullshovel Buckets, all teeth are interchangeable — a great advantage to operators.



Shovel
Sizes 3/8 to 18 yds.

Dragline
All Purpose Sizes 3/8 to 2 yds. Stripping sizes 2 to 9 yds.



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WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES





C. & E. M. Photo
C&EMonthly's Western Editor Ray Day points out the type of segregation in caliche which thorough motor-grader blading will correct. Note the fine particles in the middle of the pile and the coarse sizes at either side.

Caliche Base

(Continued from preceding page)

Department specifications called for 100 per cent of the crushed material to pass a 2-inch mesh sieve, and from 60 to 80 per cent to be retained on the 40-mesh screen. This fine material retained on the 40-mesh screen is known as the soil binder, and specifications called for a liquid limit on this material not to exceed 45, a plasticity index not to exceed 13, and linear shrinkage not to exceed 8 per cent.

Production of Caliche

Uvalde Construction Co. made four crusher-plant set-ups to produce the selected base material and the aggregate for topping course. They moved in a Pioneer 250-ton-per-hour plant, and used it in several designated pits. A 20-foot cut was also made through the crest of a hill as part of grading, and this rock was run through the crushing plant and reduced for selected base material. The material in that rock cut was considerably harder than in the regular state-designated caliche pits, but the cut was made to maintain adequate sight distance on the new road.

The caliche was drilled with an Ingersoll-Rand FM-2 wagon drill, powered by a Gardner-Denver 365-cfm air compressor. Caliche is an easy material on the Timken detachable rock bits which were used, and they would frequently drill two 20-foot holes without dulling. The holes were put down on from 3 to 7-foot centers, depending mostly on the thickness of the ledge. In a 15-foot cut on the hill, in harder rock, the drill holes were put down on 6-foot centers with rows 3 feet apart.

Holes were loaded with 40 per cent Hercules Hercomite bag powder, and set off by a No. 6 blasting exploder and a stick of 40 per cent gelatin. About 30 holes were set off at a blast by a blasting machine. The explosive ratio was 1/2 pound of powder per cubic yard

of caliche, and this figure was checked when the job was almost finished. That amount of powder gave sufficient shock to fracture the rock small enough to be loaded easily by a 2 1/2-yard shovel, and to pass the jaw crusher.

A Northwest 80-D shovel loaded four 5-yard Ford and Chevrolet dump trucks, which hauled not more than 1,000 feet to a receiving hopper at the crushing plant. An earth ramp up to the hopper permitted the trucks to dump to a Cedarapids jaw crusher, set on a Pioneer primary-crusher frame. Except for this alteration, the remainder of the plant was Pioneer.

The caliche was passed through the primary, and through a secondary roll crusher set in the Pioneer plant, before being passed through vibratory screens and off the conveyor. Crushed caliche was taken at the end of the conveyor by a 16-cubic-yard surge bin made by Pioneer, and transferred to a fleet of 4-cubic-yard Ford, Chevrolet, and Dodge dump trucks which hauled it out to the job.

Special topping aggregate for the penetration treatment was also crushed, and four stockpiles of that material were spotted equally through the job for later use.

Crushing specifications on this topping material were as follows:

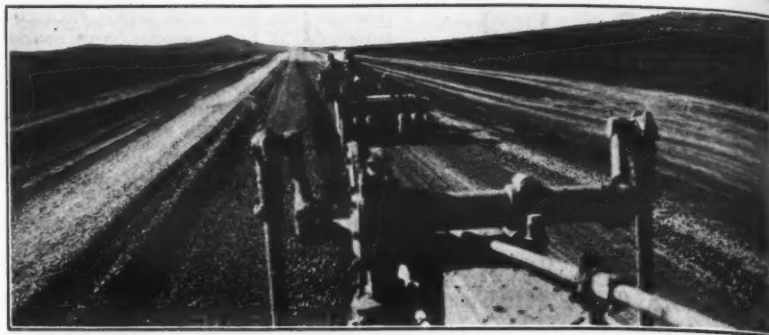
First-Course Aggregate	
Size Screen	Per Cent Retained
3/4"	0
1/2"	0-10
No. 10	70-100
	95-100
Second-Course Aggregate	
3/4"	0
1/2"	2-20
No. 10	70-100
No. 20	95-100

Output at the Pioneer plant varied from 100 tons an hour in the hard-rock cut to 225 tons per hour in the softer caliche cuts. Some caliche dust and fines were added to the hardest part of the rock cuts to give the proper balance.

Caliche Placing and Mixing

On most sections of the job the plasticity index of the subgrade was 18 or under, and 6 inches of caliche was placed. The amount of caliche, based on the volumetric content per station, was 73 cubic yards.

After the subgrade had been dressed to a true grade, as established by surveyors' stakes on the center line and both sides at 100-foot intervals, a truck spotter came in with a chain marked off in the proper spacing of loads. The



C. & E. M. Photo
From the operator's position on a Caterpillar No. 12 motor grader, a windrow of crushed caliche looked like this on the Uvalde Construction Co. job. Up ahead pneumatic rollers work on a previously bladed lift.

chain was 100 feet long. At each mark this man dug a small hole with the point of a pick, just large enough that the truck tires would not obliterate it.

He then directed the spotting of each truck by having the driver back in until his rear wheel centered on the mark. All truckloads were dumped in a pile,

without stringing the material. The State kept a checker at this operation to report on the number of loads and to see that 73 cubic yards was placed per station.

The laws of gravity, operating in the surge bin and at the dump, caused many

(Continued on next page)

**"U.S." BUILDS THE RIGHT
ELECTRIC PLANT
FOR YOUR NEEDS!**

**1500 WATT
PORTABLE**

- For Operating Power Tools
- Floodlights • Field Repair Shops • On Service Trucks • Paving Machines • Power Shovels • Earth Moving Equipment, etc.

"U.S." BUILDS A COMPLETE LINE of Gasoline and Diesel Electric Plants up to 140 KW—for stand-by, continuous duty, battery-charging, and portable uses. Skids, rings, porter bars, and trailer mountings available. Write for literature, stating type of unit and capacity required.

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Factory representatives strategically located throughout U.S.A. and Canada.

TROJAN

COMBINATION BULLDOZER AND SNOW PLOW

for International Industrial Wheel Type Tractor



Trojan Bulldozers are designed for mounting on International Industrial Wheel Tractors, I-9, I-6 and I-4. The patented parallel blade lift holds the blade in a vertical position at all times and prevents "digging in" and consequent stalling and wheel slippage. Another feature is the mechanical float position which provides flexible blade operation without common difficulty of operating four-way valve.

Interchangeable equipment include both V type and reversible one-way snow plows. Field installation is easy and full mounting instructions accompany each shipment.

Write for literature and specifications or see your International Industrial Distributor.

CONTRACTORS MACHINERY CO. INC.

Dept. CE-72

Batavia, N. Y.

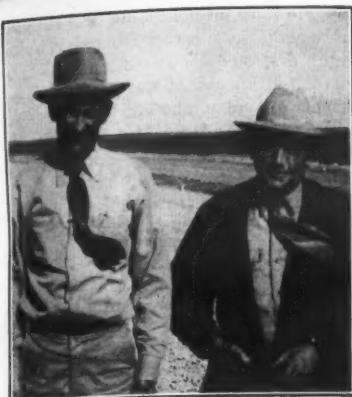
**WON'T QUIT
or cause time out**



A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

The Hayward Company
32-36 Day Street
New York, N.Y.

Hayward Buckets



C. & E. M. Photo
Sid Milligan, at the left, Assistant Superintendent for Uvalde Construction Co., and F. L. Hunter, General Superintendent, are old hands with caliche.

Caliche Base

(Continued from preceding page)

of the 2-inch particles to separate from the fines and roll towards the bottom of the pile. One of the secrets of caliche processing is to correct that segregation by a very thorough road-mixing. Water, the other part of the secret, can best be added while road-mixing is in progress. That was the system Uvalde used.

Processing sections, or "lands", were set up about 2,000 feet in length. A Caterpillar No. 12 motor grader first straddled the dumped windrow and flattened the top of the pile, leaving a little 10-inch ridge on each side. There were three gravity-feed water-tank trucks on the job, two of 2,000-gallon capacity and one of 3,600. These units then traveled across the top of the pile and put just enough water in the windrow to cause a slight bleeding about halfway down the sides. Caliche takes from 30 to 65 gallons of water per cubic yard in processing, and the material on this job required close to the upper limit.

The top of the windrow was then cut off on a slant, to mix the first material and lay about 2 inches out on one shoulder edge. The motor grader was followed by a water tank. Following the water tank were three Bros Wobble Wheel pneumatic-tire rollers, towed by International I-9 tractors and ballasted with sand to 300 pounds per inch width of tire-tread surface. The pneumatic rollers were used a great deal for compaction, along with a LeTourneau sheepsfoot. The job was set up by the State Highway Department for a limited number of sheepsfoot-rolling hours, however, so when that quantity ran out the pneumatic rollers were used.

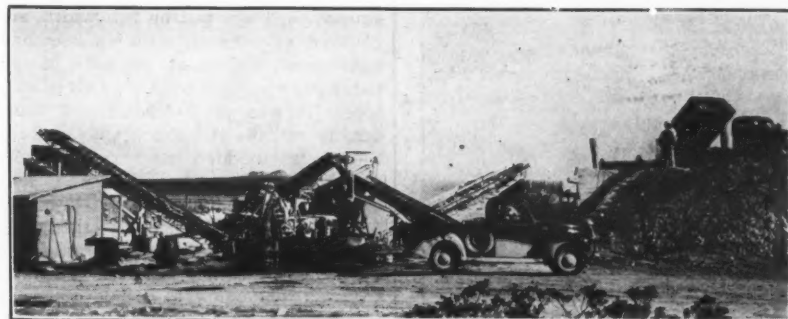
A piece of the center section of the windrow was then cut out and placed 2 inches deep on the other side of the road, and the watering and rolling process repeated. Putting down a lift on each shoulder gave the blade operator a place to put the main body of the windrow after he had mixed it.

The center part of the windrow was then cut out by blading half each way, road-mixing it thoroughly while adding water. One of the important decisions

Resident Engineer Pearce made with Sid Milligan was that of allowing all water control to rest in the hands of the motor-grader operator. If a motor-grader operator with some pride in his work can control the distribution of water, processing caliche is not difficult.

With the center section cut out to subgrade, and resting equally on the two first lifts laid down, the material was then brought back towards the center. It was laid down about 2 inches deep and the watering and rolling were repeated. The whole idea in placing a lift of caliche, according to Sid Milligan—and he has handled plenty of the material—is to put the right amount of water in each lift while it is being mixed. When the rollers start to work, the lift should have its moisture and should have been road-mixed so thoroughly that there is no more segregation of coarse material.

The process of blading in thin lifts was repeated until the selected base was topped out with the last, and slightly thinner, lift. Upon the proper placing



C. & E. M. Photo
This Pioneer plant crushed caliche for the 22 miles of selected base, turning out up to 225 tons per hour. Caliche was passed through a primary crusher, through a secondary roll crusher set in the plant, through vibratory screens, off the conveyor, and transferred to a fleet of dump trucks which hauled it out to the job on U.S. 67 in Texas.

of this last lift depends the riding qualities of a caliche-base highway. The right way to place that last lift is to blade it in loose, and then to put only a part of the compaction in with the sheepsfoot or pneumatic rollers. The top lift must be loose enough so the big particles can be worked down

through and below the surface.

This was accomplished on the Uvalde project by using an Acme and an Austin-Western Autocrat 10-ton steel-wheel roller. The top of the caliche was checked by template before turning these heavy machines loose on the

(Concluded on next page)



--- Easy on the Operator
--- Easy on the Machine

The quiet, easily controlled, coordinated performance of Bucyrus-Erie excavators results in greater output because it means less operator fatigue, less wear on the machine itself. The operator, working with easily manipulated responsive controls, finds it easy to keep a Bucyrus-Erie working at top speed without becoming excessively fatigued . . . without experiencing the end-of-shift slow downs that cut output. Smooth performance means more consistently efficient machine effort, too. It means that the operator gets full use of engine power all through the shift because losses due to friction and vibration are tremendously reduced. It means

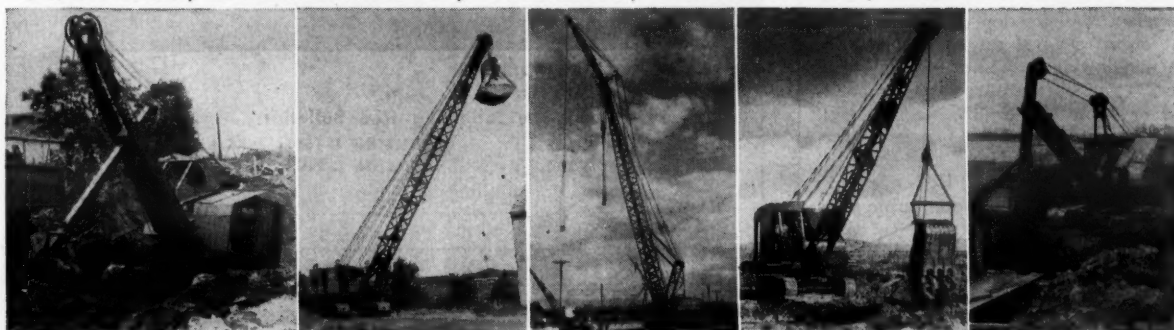
that maintenance requirements are lower because it indicates accurately machined close-fitting parts held in lasting alignment and operating with the smoothness that cuts wear to a minimum. Yes, quiet coordinated performance is a big reason why Bucyrus-Eries consistently outproduce other machines. Check with men who have operated Bucyrus-Eries, or watch one at work yourself. You'll be convinced that Bucyrus-Eries are your best bet for big output. BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin.

48E45

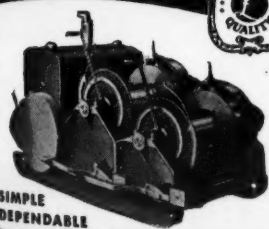
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STERLING HOISTS



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STERLING MACHINERY CORPORATION
105 Southwest Blvd., Kansas City



C. & E. M. Photo
A 10-ton Austin-Western 3-wheel roller puts a finishing touch to the caliche base course on U. S. 67 in Texas.

Caliche Base

(Continued from preceding page)

caliche. The base course was "bull-wheeled" across the road; this means that the rolling was done longitudinally, moving across with no lap of the roller. Then it was lap-rolled at least three times to iron the surface to its proper smoothness. The grade was checked by template after rolling, and any motor-grader work necessary at that time was promptly re-rolled and sealed with a light sprinkling.

On account of the scarcity of water and the long hauls, no slush-rolling was done. Slush rolling is often called for when predominating coarse caliche particles make good densities difficult. It involves the heavy application of water with simultaneous smooth-wheel rolling. It breaks caliche down to finer particles, and rolling is then continued until the caliche is set up and sealed. There is always the danger, of course, in applying so much water that it will go through to the subgrade.

Old-time caliche handlers find it easy to detect the faults that sometimes appear in field work. Unsealed pockets show up as rough patches in an otherwise slick grade, and the caliche particles can be kicked loose with the toe of a boot. Caliche put in too dry on too wet a subgrade shows up immediately with small hair cracks on the surface. Caliche applied too wet breaks up into a spongy mass. All these defects were corrected when they occurred, by ripping out the offending area if necessary.

The finished base course was carefully checked by driving an automobile at various speeds up to 50 mph. That is the only really sure-fire way of testing the rideability of caliche. The selected material was brought up very nearly to its ultimate elevation, and the final dressing left for a later date when the penetration surfacing was put on.

Penetration Surface

At the time the project was visited for CONTRACTORS AND ENGINEERS MONTHLY, the surfacing had not been placed. Plans were complete, however, for this work, and the four piles of surface aggregates had been stockpiled.

The 20-foot strip of surface on the caliche was primed full width at one pass by 0.20 gallon of MC-1 asphalt, applied by an Etnyre distributor at a temperature of 150 degrees. This prime coat cured several days.

A distributor then shot 0.25 gallon of OA-230 per square yard, at a temperature of from 275 to 325 degrees, full width. This hot oil was covered immediately with the No. 1 aggregate. It was put on through a Buckeye chip spreader, at the rate of one cubic yard of the aggregate per 100 square yards of surface. This rock was then lightly bladed by a pony grader, and rolled once with a 3-ton smooth roller.

Then 0.35 gallon of OA-230 per

square yard was put on full width, and covered immediately with No. 2, or fine, aggregate, applied at the rate of one cubic yard per 175 square yards of surface. It was pony-bladed and thoroughly rolled. All excess particles not thoroughly bedded after rolling were swept in the clear by a power broom, and the new highway opened to traffic. A penetration surface of this type makes a very tough armor skin about $\frac{3}{4}$ inch thick. The OA-230 will not bleed up through the chips. An automobile on this surface will ride true and smoothly at high speed.

Personnel

The new highway was conceived and planned under the direction of State Highway Engineer D. C. Greer, with Jed Robinson in charge as State Construction Engineer. It was administered locally by District Engineer T. J. Kelly, with headquarters at Pecos, Texas.

Assure your future; combat inflation by buying U. S. Savings Bonds.

Electric-Tools Catalog

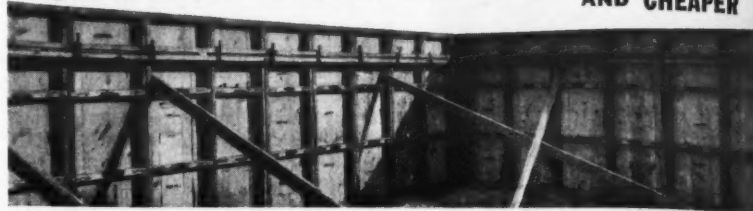
A catalog describing its complete line of electric tools for 1947 is available for the asking from The Van Dorn Electric Tool Co., Division of Black & Decker Mfg. Co., Towson, Md. This 66-page booklet may be punched for insertion in a looseleaf folder or in a stock catalog binder if desired.

It contains information on over 72

electric tools, attachments, and supplies, including drills, buffers, bench grinders, hammers, saws, etc. Each tool is illustrated, specifications are listed, and prices are also shown. One page is devoted to a description of the Van Dorn motors, which are tailor-made for every tool, the company says.

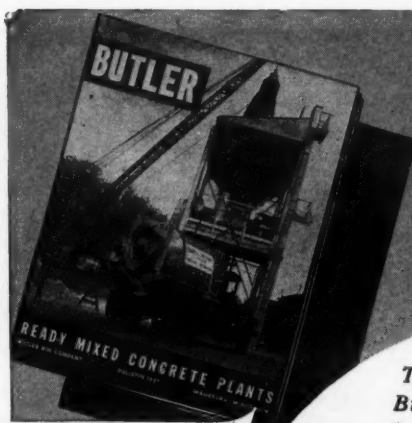
Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 75.

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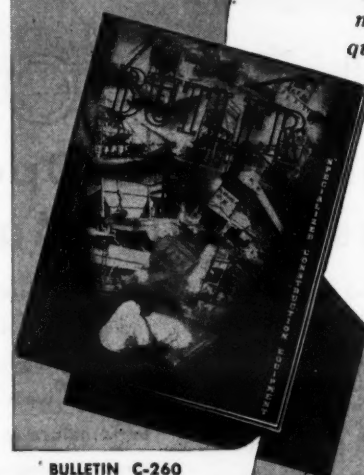


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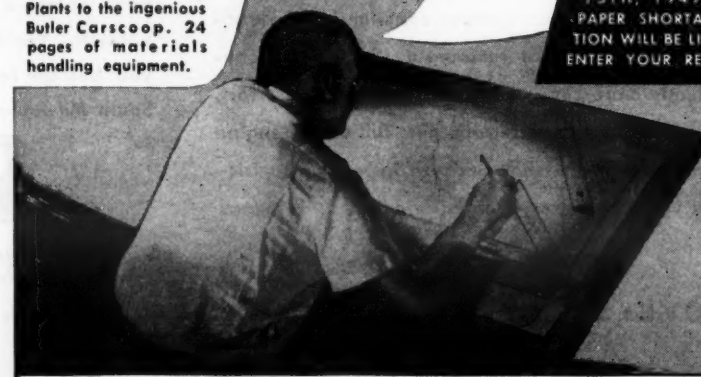
The Symons system of forming is a patented system which brings costs down and the quality of the job up. Write for our catalog, and free estimates and form layouts for any job.



BULLETIN C-185
Butler Ready Mixed, Concrete Plants. 24 pages of illustrations.



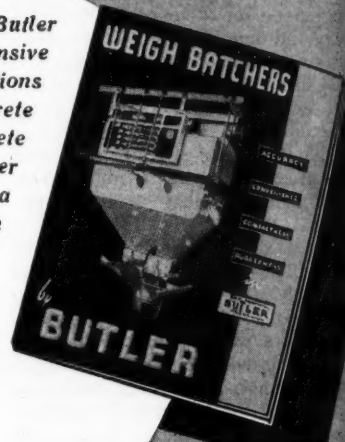
BULLETIN C-260
From Central Mixing Plants to the ingenious Butler Carscoop. 24 pages of materials handling equipment.



These four profusely illustrated Butler Bulletins show in clear, comprehensive detail, Butler engineered installations and equipment in Ready Mixed Concrete Plants, Central Mixing Plants, Concrete Products Plants, Weigh Batcher and other materials handling units. . . . In over a quarter of a century of experience in planning, designing and building such specialized construction equipment, Butler Engineers have encountered and have ingeniously solved many highly unusual problems. These Butler solutions, — illustrated with photographs are shown in these Bulletins. . . .

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Completely describing and illustrating Butler Weigh Batcher. 12 pages.



BULLETIN C-210C
Emphasizing design and use of Butler Portable Bulk Cement Plants. 16 pages.

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WAUKESHA, WISCONSIN

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BUTLER BIN CO.
WAUKESHA, WISCONSIN



When a pier of a bridge in Indiana settled 30 inches, due to a flood, cribbing was placed on top of it and Coffing Safety-Pull ratchet-lever 15-ton hoists (left) were used to raise the bridge spans. Then I-beams and sheet steel were placed on the pier to hold the spans in proper position (middle photo). The view at the right shows the bridge two days after reconstruction was started, with alignment restored.

Novel Hoist Method Raises Bridge Span

Floodwaters of Coal Creek in Fountain County, Ind., undermined the upstream end of a concrete bridge pier, causing it to settle approximately 30 inches. As a result, the two spans achieved such an angle that county road authorities found it necessary to condemn the bridge. Contractors brought in for consultation felt that it was impractical to raise the bridge by the screw-jack method; there was constant danger of freshets washing away the cribbing and allowing the bridge to topple.

However, a method was devised which involved the use of Coffing Safety-Pull ratchet-lever hoists made by the Coffing Hoist Co., Danville, Ill. This system consisted of placing cribbing on top of the tilted pier, raising the bridge spans by hoists suspended from this cribbing, and then placing a permanent blocking under the span at such height as to leave the bridge level.

Cribbing was placed on the pier on both the inside and outside of the span girders on the upstream side of the bridge. This necessitated removing part of the flooring. The cribbing was built up to 7½ feet, and heavy timbers were laid across the top. From this timber were suspended two Model WG 15-ton Coffing hoists, which were then attached to the ends of the 125-foot spans. Both hoists were operated simultaneously in order to keep the entire bridge structure in balance at all times while raising the spans.

Two Coffing Model ZG 6-ton hoists were attached to shore anchors 200 feet from the bridge, with cables running to the top of the bridge structure. These permitted pulling the frame structure back into alignment while the bridge was being raised.

After the spans had been raised 31 inches, two 16-inch steel I-beams, 5 feet long, were placed crosswise on the pier where the spans formerly rested. They were placed 24 inches apart and tied together with 1-inch bolts. Headers were placed at each end, and the section thus formed was filled with concrete. Two layers of additional 6-inch I-beams were then placed crosswise under each span base, and ½-inch sheet steel was added to build the pier section up to 30 inches. The rollers were

then placed under each span on 1-inch sheet steel.

When weather conditions permit, a

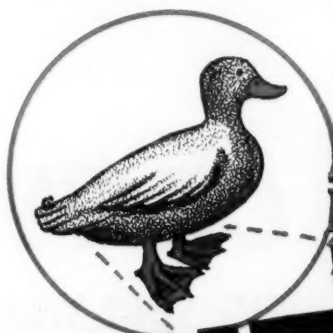
concrete and steel form will be built around the blocking and across the pier in order to give additional support.

Some of the features claimed for this type of raising are: (1) the entire job cost less than \$1,000, which included filling around the bottom of the pier to prevent further washing; (2) the job was done by six men in less than two days; (3) due to the fact that the work was always done from the top of the bridge, there was a large degree of safety for the men; and (4) the bridge was balanced at all times, so that there was little chance of its toppling over.

Further details on this method of bridge-raising are given in Bulletin B-13 available from Coffing. Or use the enclosed Request Card. Circle No. 79.

Welders' Supplies in Dallas

A new sales and supply office has been opened by the Big Three Welding Equipment Co., Inc. of Fort Worth, Texas. It is located at 565 W. Commerce St., Dallas, Texas. The firm handles most types of welding equipment and accessories, including that of Lincoln Electric Co. of Cleveland.



UNIT "Webbed Feet" FOR SOFT, LOAMY SOIL!

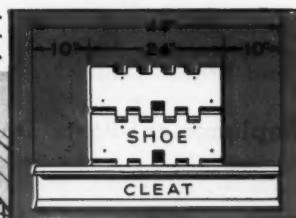


Every UNIT Crane or Shovel can be equipped with broad, heavy duty cleats that practically double the bearing surface of the machine and make it possible to travel over soft, loamy soil. Ideal for use in swamplands... sugar plantations... in fact, wherever the soil is too soft or marshy for the ordinary excavator. "Webbed Feet" is an exclusive UNIT feature, broadening the scope of your UNIT Excavator. It enables you to go places formerly impenetrable and makes your UNIT more VERSATILE, more PROFITABLE.

Cleats are bolted to the crawler shoes and are quickly detachable. A special arched axle adds stability and provides additional clearance between the machine and the ground.



Note that cleats practically double the bearing surface of machine.



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C-210C
izing design
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alk Cement
6 pages.

CO.
NSIN



This hydraulically operated Hydro-Scoop, for use with wheel tractors, has a capacity of from 7 to 10 cubic feet. It is a product of the Stockland Road Machinery Co.

Small Earth Scoop For Wheel Tractors

A small earth mover for use with wheel tractors in excavating, filling, leveling, ditching, and in levee, dam, and road building and similar operations, is available from the Stockland Road Machinery Co., 2653 34th Ave. So., Minneapolis 6, Minn. At present, models are being made for Ford-Ferguson, John Deere A and B, and International H and M tractors. Capacity of the scoop is approximately 7 to 10 cubic feet of dirt.

Hydraulically operated, the Hydro-Scoop is said to fill in 4 to 5 feet of travel. It is then raised to permit rapid movement over any type of terrain. It dumps while moving and will spread while dumping. A depth of cut from 1 to 12 inches below the tractor wheel level can be obtained with these units.

The company also makes a 6-foot leveler blade attachment for use with the Hydro-Scoop; it is available as extra equipment or as a separate unit.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 45.

Drawings Reproduced With a Dry Process

A line of positive-print papers for the reproduction of engineering drawings is now being produced by J. H. Weil & Co., 1315 Cherry St., Philadelphia 7, Pa. It is claimed that no negative is needed; no wet chemicals or solutions are used in the dry-developing process; and prints are made directly from the drawings in one operation.

It is possible to produce either blue or red-line drawings on a white background, as well as sepia transparentized prints as intermediate originals. The latter are said to save retracing when design changes are desired.

Papers are available for two printing speeds, regular or fast. Weilline positive-print papers are made in either roll or sheet sizes. They can be used with regular blueprint machines, when combined with a dry-developing machine which the company can supply.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 8.

Replacement-Parts Data

Catalogs which describe its line of manganese-steel welding products for the repair of manganese-steel castings, power-shovel parts, and similar equipment are available from the Taylor-Wharton Iron & Steel Co., High Bridge, N.J. The products made under the Tisco trade name consist of welding rods, filler bars, dipper-tooth repoints, rolled rods, and wearing parts for crushing and pulverizing equipment.

The various products are illustrated, and dimensions and prices for the parts in the line are given. A brief description is included of the advantages claimed for manganese-steel replacements, and the requirements which they should fulfill.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 60.

PRA Research Work Helps Road Program

It has been estimated by the Public Roads Administration, Federal Works Agency, that the cost of highway research is less than one per cent of the total amount expended by the Federal government for highways. But the savings it effects for the nation can be counted in the millions, estimates the PRA, due to the construction of better, safer, and more durable roads.

The research laboratories of the Public Roads Administration at present occupy space in a group of buildings on a 55-acre tract in Arlington County, Va., just outside the nation's capital. Many of its studies in road materials, bridge and pavement design, soil conditions that affect highway engineering problems, etc., are carried on jointly with state highway laboratories, the Highway Research Board of the National Research Council, and other research agencies.

This research had its beginning when the Office of Road Inquiry was established in the Department of Agriculture in 1893. During the early years of the bureau, its activities were confined largely to the construction of demonstration roads and the promotion of campaigns for good roads. Its scope was broadened after the passage of the Federal-Aid Road Act of 1916 and the Federal Highway Act of 1921, which provided funds on a matching basis to help the states modernize their highways and integrate them into a country-wide network. From then on, more attention was given to the scientific testing of road materials.

The research work of the Public Roads Administration has been further extended by the passage of the Federal-Aid Highway Act of 1944. The size of the post-war highway program brought about by the passage of this act will call for intensive research to develop methods of road construction better than ever before.

Liquid Rust Remover

A liquid rust remover, said to work without rubbing, is produced by Allied Products Co., Dept. R60, 1133 W. Newport St., Chicago 13, Ill.

It is claimed that CorOdex will remove a coat of rust up to 1/4 inch thick; that it is so penetrating it reaches pin-point spots, pits, crevices, cracks, or corners; that it can be applied with a

paint brush or swab, without rubbing; and that it is non-explosive, non-inflammable, and will not injure metal or the hands of the user.

The corroded surface can be treated by hand application or dipping, and wiped with a clean dry cloth. It is said that long immersion leaves the surface with a blue-black oxidized finish which

increases resistance to further rusting. It does this, the manufacturer states, without changing the contour or shape of the article treated, and without causing any structural changes whatever in the metal.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 22.



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THE SURE WAY TO TRENCHING PROFITS

Among the many exclusive CLEVELAND pioneered features that assure trenching profits on all kinds of jobs—oil, gas, gasoline, water, sewer, conduit and drainage are:—correct, full crawler, wheel type design—smooth flowing ample power correctly applied and a wide range of transmission controlled speeds assuring the best speed for the job at hand—low operating and fuel costs—minimum maintenance expense because of superior quality materials, fine engineering and unit type construction.

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Salt Tablet Dispenser, 500 tablet capacity, extra \$2.75
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Mounting Bracket, holds fountain to wall or floor of buildings, trucks, tractors, locomotives, etc. \$4.50
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The Dobbins PORTABLE SANITARY DRINKING FOUNTAIN protects the health and strength of workmen on any job... anywhere... with cool, clean drinking water—at the press of a button! Aids railroad, highway and building construction, repair and maintenance crews... miners, and all other workmen on jobs where a permanent, sanitary drinking water supply is not available. Banishes germ-spreading practices such as use of "common" drinking cups, open pails, dippers, etc. Four gallon capacity tank is fully insulated. Air pressure for instant flow of water is supplied with a few strokes of the pump.

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Superbilt
PORTABLE DRINKING FOUNTAIN



The Burch Tiltlev blade for grading gravel roads, snow removal, and similar operations, is designed for truck mounting as illustrated here.

Hydraulic-Controlled Truck-Mounted Blade

A grading-blade attachment for use on rough gravel roads, shoulder work on hard-surfaced roads, removal of snow and ice, etc., is made by The Burch Corp., Thomas and Bauer Aves., Crestline, Ohio. Draft for the Burch Tiltlev blade is taken from a front truck hitch and transmitted through a draft bar to the frame of the machine, a feature which is said to eliminate strain on the truck frame.

The machine is raised and lowered and pressure applied to the cutting blades by means of two double-acting power hydraulic rams. The rams are connected to the truck frame by means of ball-and-socket joints equipped with shock springs. The rams are trunnion-mounted to provide sufficient movement to maintain true alignment of the ram, piston, and hinge on the moldboard to which the piston is directly connected.

The moldboard is $\frac{3}{4}$ inch thick and has standard state punching. It has a 35-degree horizontal-cutting-angle adjustment. Two sizes are available. The 12-inch x 10-foot unit weighs 1,900 pounds, and the 12-inch x 12-foot unit weighs 2,050 pounds. The hitch used for the Tiltlev blade can also be used as the lower section of a Ross snow-plow hitch.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 23.

Wheel-Tractor Catalog

An illustrated 24-page catalog on its wheel tractors is being distributed by the Industrial Power Division of International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill. Two-color Bulletin A-103-JJ lists many applications of International tractors and illustrates some of the matched equipment available with them.

Models covered include: (1) three heavy-duty tractors powered by gasoline engines which can be equipped to burn kerosene or distillate; (2) two diesel-powered heavy-duty tractors; (3) a light tractor powered by a gasoline engine for highway mowing and similar applications. Complete specifications are listed.

Also included is a discussion of the salient features of International diesel and gasoline engines, the gasoline-con-

version starting system, fuel-injection system, and sectional views of chassis features. The back cover page is devoted to a list of distributors who han-

dle International power units.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 81.

Power, Traction-Driven Brooms Sweep Two Ways

The line of road brooms made by Littleford Bros., Inc., 485 Pearl St., Cincinnati 2, Ohio, is described in Bulletin U-19 now available from the company. These include both power-driven and traction-driven models.

On both models, the brush assembly is hinged in the center, thereby allowing for swing either to the left or right, whichever direction of sweep is desired. The brush is raised and lowered by means of a hydraulic lift arrangement. This hydraulic system also permits any desired sweeping pressure on the road surface.

Also described in the bulletin are the sprinkler and the blower attachments for use with these brooms. The final page of the catalog is devoted to speci-

fications of the No. 106 two-way traction-driven broom, the No. 108 two-way engine-driven road broom, the No. 111 sprinkler attachment, and the No. 112 two-way dust-blower attachment.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 69.

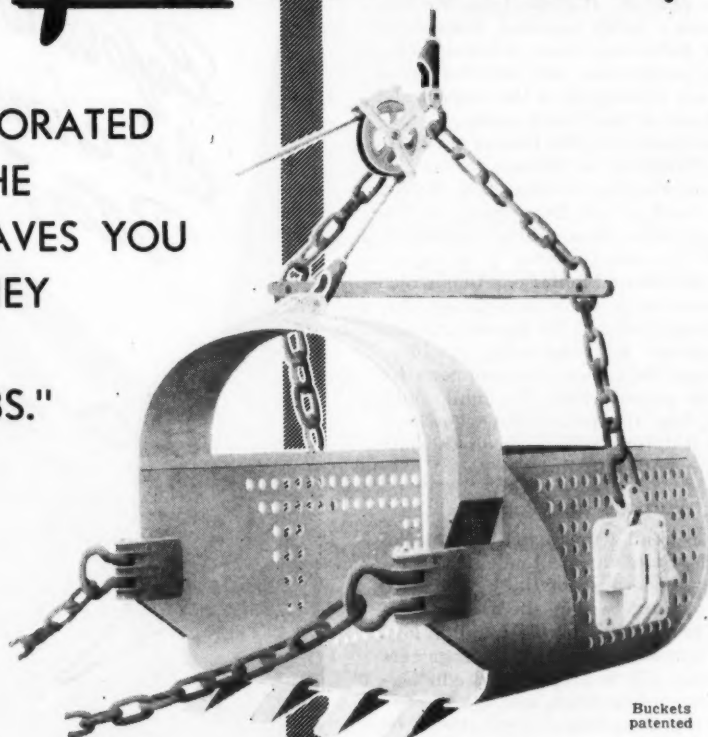
Hoist Firm Expands Plant

Its plant expansion has been completed, announces Superior-Lidgerwood-Mundy Corp., 3rd St. and Grand Ave., Superior, Wis. Much equipment has been transferred from the closed Elizabeth, N. J., plant of Lidgerwood-Mundy, and production is said to have reached full status at Superior.

Products of the corporation will consist of the J. S. Mundy Hoisting Engine Co. line of contractors' hoists, dredge hoists, power engines, etc.; the Superior Iron Works Co. line of hoisting machinery, steam marine auxiliaries, etc.; and most of the Lidgerwood Mfg. Co. line of hoisting machinery.

Another Yaun Cost-Cutter!

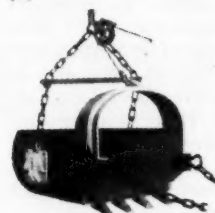
THE YAUN PERFORATED BUCKET, LIKE THE BASKET-TYPE, SAVES YOU TIME AND MONEY ON THOSE "DIFFICULT JOBS."



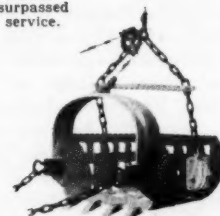
Buckets patented

This bucket has been designed and produced with the same precision that goes into the manufacture of the YAUN Shell Type and the YAUN Basket Type buckets. The all welded construction gives greater durability and strength—longer life. And the perfect balance means easier handling, faster and cleaner dumping. The holes (you may order your bucket with any size) insure a full load every trip—especially with wet material. Fittings, tooth points and chains are of Manganese steel. Orders received from $\frac{3}{8}$ cubic yards on up.

Ask your dealer—or write for further information.



YAUN SHELL bucket, unsurpassed for general service.



YAUN BASKET bucket, the world's champion for "soupy" material.

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YAUN

DRAGLINE BUCKETS AND MFG. PLANT

BATON ROUGE, LA.

Bureau Tells Public Of State's Activities

State Dept. of Public Works Public Relations Bureau Prepares and Distributes News, Policies and Methods

★ DURING the past year and a half the people of New York have learned a great deal about the program and activities of their state's Department of Public Works. Through press and radio they have been kept constantly up-to-date on the progress of its \$840,000,000 five-year post-war program of public-works construction. So widespread was the Department's press coverage during the first year after V-J Day that, were all its published news for that period combined into a single newspaper, the result would be a 470-page edition. On top of this, the rest of the nation was learning of the same program through the medium of magazine articles written by executives of the Department of Public Works.

This tremendous volume of publicity for the great program now under way in New York State is not accidental. Neither is it in the form of propaganda. It consists of real news, down-to-earth facts that people like to read and editors like to publish. It stems from the Department's newly created Bureau of Public Relations, whose policies, methods of preparation, and distribution of news are earning for it the respect and confidence of the fourth estate.

High up on the 30th floor of the State Office Building in Albany, its staff of four, working in an office 25 x 28 feet, keeps track of all Department activities. It tells about them, in simple terms, in a steady string of press releases distributed to those outlets which are interested in them. Its tools are simple. They consist of the typewriters and mimeograph and addressing machines which are the customary equipment for such an organization. The philosophy underlying its procedures, however, makes it different from run-of-the-mill "press agent" bureaus.

Purpose and Policies

The Bureau was created by Charles H. Sells, State Superintendent of Public Works, because of the patent need for a medium within the Department whose job it would be (1) to tell in laymen's language the work its engineers are doing, (2) to prepare and edit Department publications, and (3) to represent the Department generally in its dealings with the public. To carry out this purpose, Superintendent Sells chose a layman, Robert J. Shillinglaw, as the Director of the new bureau, and assigned to him, as Technical Assistant, W. Joseph LaFleur. These two, together with two typists, form the entire staff of the new unit. Working together as a team they are accomplishing the goal established for them.

Starting from scratch and uninhibited by precedents, the new unit was able to formulate what have proved to be sound policies of operation. First and foremost, these policies call for complete and unvarnished factual news stories. Secondly, because editors are frequently swamped with "hand-outs" in which neither they nor their readers have any interest, it was determined that localized stories would be distributed only to press and radio stations in the area concerned. Only in rare instances is one of the Bureau's press releases distributed to each newspaper in the state.

The responsibilities of the New York State Department of Public Works are extensive and varied. In consequence, its news releases cover a great many fields. The highway construction pro-

gram is of greatest magnitude and consequently is given the lion's share of attention. But in addition, full news coverage is given to the operation of the Barge Canal System, the activities of the State Architect, and to each of the other units which blend together to make up the organization of the Department of Public Works.

Distributing Press Releases

Because of the complexities of Department activities, and because the major portion of its news involves local rather than general circulation, it was first necessary for the Public Relations units to establish positive methods and means of distribution. Complete lists of all state newspapers were compiled and

(Continued on next page)

NOW Rolled from Alloy or Mild Steel



Caine CORR-PLATE Steel Piling

Roller from a new steel alloy, Caine Corr-Plate is now 25% stronger and has nearly 100% greater corrosion resistance. This alloy makes available equal strength and nearly double the life in a 25% lighter piling. Approved by Highway Departments and U. S. Engineers.

Caine Corr-Plate Steel Piling has been used the world over for Foundations, Dams, Retaining Walls, Docks, Levees, Bulkheads, Sewers, Disposal Plants and hundreds of other jobs—it's stronger, lighter, nestable, easy to drive and water tight; can be re-used again and again. Doubled life and 25% greater strength make Caine Corr-Plate Steel Piling the bargain buy in piling!

NOW, MORE THAN EVER BEFORE...

STRONGEST PER POUND WEIGHT

CAINE STEEL COMPANY

STEEL PILING DIVISION, 1820 N. Central Avenue, Chicago 39, Illinois



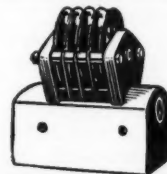
MEMO to All Construction Supts:

*Before we buy Buckets
let's check Haiss
Ratio 7:1*



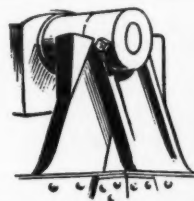
HIGHEST CLOSING RATIO (up to 7:1)

Can be reeved 3, 4, 5, 6 or 7:1 for speed or power as required. Exclusive 4-Position Wedge-Lock dead ending keeps reaving always parallel and 100% centered in sheave grooves.



LOWER SHEAVES HIGH ABOVE COUNTERWEIGHT

Up, out of the muck. Non-pocketed. No place for dirt to jam, to cause friction or undue rope wear. Bolt holes in block provide for added counterweight.



CAST STEEL BLADE ARMS FOR STIFFNESS

Rib-reinforced. Rigid strength and extra long bearings (renewably bushed) keep bowl closing true. Full efficiency; bigger payloads.



HEAVIEST JAWS OF ANY BUCKET OF ITS KIND

Abrasion resistant alloy. Will stand heavy battering and still hold shape. Chisel-point or pick-point teeth of similar extra strength.

Among Buckets, Haiss Hi-Power excels through a time-tested combination of many superior features.

Weight distribution, for instance, is so concentrated that the bucket jaws carry downward to bury the entire bowl to insure the biggest possible payload.

Similarly, when the Haiss Hi-Power tackles a stuck-fast boulder it "grabs tight" to shake and tug until it's loose and "hoist away".

Investigate now the greater efficiency that comes naturally with buckets engineered by Haiss. Catalogs on request.

GEORGE HAISS MFG. CO., INC., Canal Place & E. 142nd Street, New York 51, N.Y.

Distributors in all large cities

HAISS

Bureau Tells Public Of State's Activities

(Continued from preceding page)

arranged by counties. Addressing plates were prepared. By using colored symbols which corresponded to those on a key map, it became possible to select at once the appropriate set of addressing stencils for any given county as needed.

The next step was to develop a basic mailing list. This would comprise certain publications which, for various reasons, would be interested in obtaining all Departmental releases. Then the Bureau determined, from officers of the New York State Legislative Correspondents Association, with headquarters in the State Capitol, just what newspapers were represented locally by staff writers or correspondents. Since all releases would be taken directly to the pressroom in which these writers and representatives of the wire services work, the names of their papers were deleted from the county lists, together with any which might be included in the basic list. Then, because of the regular release of news pertaining to the Barge Canal system, another set of addressing stencils was prepared for publications interested only in water-transportation news and for newspapers in communities served by the canals.

With this circulation pattern established, all that remained was to develop a simple system which would indicate to the clerical staff just what type of distribution was to be given to each individual story. Because each release was to be numbered consecutively, the use of symbolic letters after the release number was decided upon.

All stories, except those prepared exclusively at the request of an individual publication, go to both the basic mailing list and the writers at the Capitol. Therefore the letter A is used to indicate a release of general nature which has no other mail distribution. A second type of release, which because of content is of immediate interest only to individual communities, is termed a B release. In consequence it is mailed to those papers which are published in the community concerned.

When the news content of a release is of interest to a county or group of counties, it is given a C classification and is mailed to all newspapers in that area. At the same time, if the story content is sufficient to warrant distribution to appropriate regional radio stations, it is forwarded in sufficient quantity to the State Radio Bureau, which transmits it directly to interested stations. This is true of all types of press releases.

Other classifications have also been established. An R release is one which is prepared for radio use only. It is usually some action-compelling message which is to be used as a spot announcement. Or it may be a fact sheet for studio files as background information on which broadcast scripts may be prepared. An X inserted after the serial number indicates a release which has been prepared exclusively for the publication which is named thereon.

The clerical staff of the office is familiar with the full significance of these classifications. It is able, without other instructions, to route the releases to the appropriate outlets without delay. Furthermore, it has ready at all times three or more sets of envelopes addressed to each publication in the state. These are filed by counties and Department districts so that news may be mailed out within a matter of minutes after the release has been prepared.

The Bureau also seeks to time its release dates so as to insure arrival of copy on the editor's desk well before the deadline of the issue in which it

appears. It further endeavors to get out the bulk of its major stories early enough in the week that they may still be front-page news when published in the weekly papers to which they are directed. In this manner, all publications are protected against being "scooped" by rivals. And the editor has time to plan his layout, adding pictures, maps, or other local color if he so desires.

Handling a Highway Project

All news of the Department, its activities, its lettings and awards, is written and distributed by the staff of the Public Relations Bureau. It has developed an almost unique procedure which rounds mutually to the benefit of the Department and the public. On that score it might be well to follow through on the unit's treatment of a typical highway project.

Information on projects to be included in a forthcoming letting are provided the Public Relations office by the Department's Bureau of Contracts and

Accounts. This is done prior to the date on which initial advertising appears. From this preliminary data the Bureau prepares what it aptly calls a "quickie"—a short, succinct statement as to the location, type, mileage, general construction features, and estimated cost of each project to be included in that letting.

This story is distributed to the press and radio wire services, and to corre-

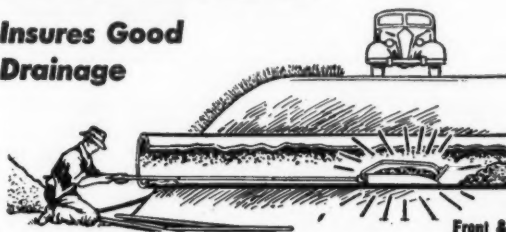
spondents for various major newspapers in the state at their pressrooms in the State Capitol. It is also mailed to each newspaper in the areas where work is to be done, if those papers lack Albany representation. The release is distributed far enough in advance to assure publication no later than the day that official advertising begins.

On the day of the letting, a second

(Concluded on next page)

MORCO CULVERT CLEANER

Insures Good Drainage



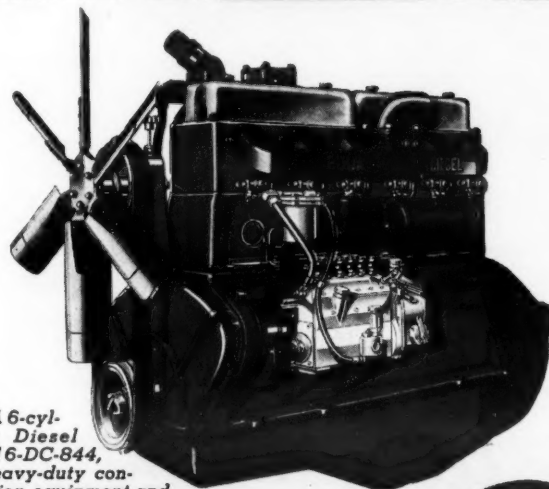
Restore clogged culvert pipes to service with the "Morco" Culvert Cleaner. Quick-acting, non-damaging, easy operating "Morco" is the most satisfactory tool yet developed for this work.

MONARCH ROAD MACHINERY COMPANY

Front & Douglas N. W., Grand Rapids 4, Michigan



BUDA Diesel-powered shovel loading BUDA Diesel-powered Euclid Trac-Truk.



BUDA 6-cylinder Diesel Model 6-DC-844, for heavy-duty construction equipment and trucks. Also available with Supercharging.



BUDA Diesels provide rugged power for scores of highway and off-highway units like this Oshkosh Truck.

... Specify
BUDA
power-proved
DIESELS

for construction and earth-moving equipment!

See your nearest BUDA Distributor

BUDA

15412 Commercial Avenue
HARVEY (Chicago Suburb) ILLINOIS



Bureau Tells Public Of State's Activities

(Continued from preceding page)

story is distributed. It is similar in style, but it includes bid prices submitted when proposals were opened, and is for immediate release.

As soon as it is determined just what contracts are to be awarded on the basis of bids received at the lettings, the Bureau then goes to work preparing detailed stories of each individual job. Such stories are written from a strictly local point of view. They are directed to the reader back home who has a keen personal interest in the work.

They tell exactly where the job begins. They describe fully the route it will traverse. They list individual properties and local landmarks so nobody who is acquainted with the region will have difficulty knowing just where the highway is going and what benefits, in the form of improved highway facilities, will accrue to him as an individual.

That they are popular locally is evidenced by the front-page position given them in practically all of the local papers to which they are directed. They follow the newsman's axiom of telling the whole story in the first paragraph. Therefore, they are easily condensed to desired length by the wire services and by individual papers outside the area of immediate interest.

The huge volume of work turned out by this small staff—about 100 releases every three months—is made possible by the excellence of the construction plans from which Mr. LaFleur prepares the detailed stories, by the intense organization of Bureau procedures, and by its close liaison with all other units of the Department. Time is required to prepare these news articles. Yet they are ready, with stencils cut and envelopes addressed, well before the moment arrives for their release.

At the same time, the Bureau keeps in close contact with news published about the Department through clippings provided twice a week by a clipping bureau. Through a close scrutiny of these items, which are gleaned from the pages of more than 600 newspapers published in the state, it is possible to determine what use has been made of Department releases. But of even greater importance, the examination of these clippings also enables the Department to keep its fingers on the public pulse through editorial comment and locally written items about Department activities and projects.

One special type of release, which the Bureau distributes occasionally to all papers in the state, consists of a series of "fillers". These are short two or three-sentence items about the Department, novel features on some phase of its program, or other comment of general interest. Each is a story in itself. Weekly newspapers, particularly, use these short items as column closers. And the returned clippings on them run into the thousands.

Other Activities

From all of this it might seem that the Public Relations Bureau of the New York State Department of Public Works devotes all its time to the preparation and distribution of news. But such is not the case. Within the scope of its responsibilities come many other activities. These include research, editing speeches and articles prepared by the Department staff, editing urban-area reports on which will be based construction programs for the cities concerned, preparing the Department's Annual Report, and other similar publications. They also include planning and directing any public ceremonies which the Department may conduct in connection with its work, and any other contacts between the Department and the public generally.

A case in point has to do with the new Official Highway Map recently published by the Department. It was the first such map to be issued by New York State in many years. To Public Relations went the job of placing it in the hands of the traveling public. Through press and radio it informed the public of its availability. Bulk quantities were shipped at once to hotels, travel agencies, tourist camps, chambers of commerce, and other similar outlets. Then came the avalanche. As the result of the direct publicity, individuals by the thousands wrote to the Department at Albany requesting copies of the new maps. Stocks furnished to various distribution points were consumed almost overnight. Extra temporary help was required to handle the flood of applications until all were filled and travelers were provided with the latest and most accurate highway information about New York State.

Another of its service functions is the preparation and distribution of the Department's Highway Condition Bulletin. This is prepared monthly during the touring season. It gives motorists full information as to the location of highway construction projects, suggested detours, and other pertinent data which will acquaint them in advance with the construction work to be encountered during their travels. These bulletins are distributed to all newspapers and radio stations in New York State, to travel agencies, touring bureaus, automobile clubs, and all other outlets through which the public may obtain the desired information.

To tell the story of its overall program, the Bureau has secured publication of magazine articles prepared by executive personnel of the Department. Since its organization eighteen months ago, it has helped tell the story of New York State's post-war public-works program in nearly half a hundred such articles. It has further assisted editors and feature writers by providing them with whatever data and materials it has on hand which are appropriate to articles or features being prepared by such outside agencies. Writers and editors alike have learned that they may obtain desired information from the Bureau promptly and accurately. It is because **CONTRACTORS AND ENGINEERS MONTHLY** has found such to be the case that this article is published.

Important to Tell the Story

No state in the nation has ever undertaken a public-works construction program of such magnitude as the

\$840,000,000 five-year program on which New York is now engaged. Hundreds of projects, ranging from the smallest culvert replacement to the construction of the gigantic Thruway which will span New York State, make up that program. Each job is a story in itself. Each is of real interest to some section of the state. Telling each story to the folks back home, who use the various highways and other public facilities in their daily business, is an important job. It is one which should be encouraged and expanded in each state of the nation.

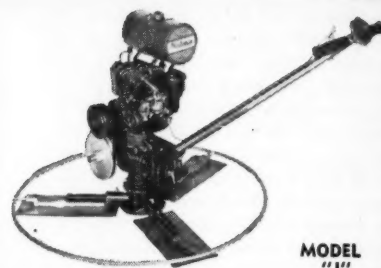
A small staff, interested in its work, sincere in its approach to the public through the distribution of real news, can do a big job if it has the wholehearted support of the entire organization for which it speaks. Such a staff, backed by the enthusiastic cooperation of the New York State Department of Public Works, is telling that State's story efficiently and effectively.

Machine Economy and Perfection for SMALL CONCRETE JOBS

The Perfect Mechanical Trowel LIGHTWEIGHT FLOATING - FINISHING MACHINE

Eliminates back-breaking handwork . . . produces a dense, wear-resistant slab, free from ripples and depressions. May be adjusted by control handle to any pitch, while in operation. A versatile machine . . . produces either traction surfaces for walks or vehicular drive-ways . . . or perfectly smooth floors, suitable for dancing. 35" circumference goes through 36" doorways. Weight 105 lbs. with gas engine or electric motors.

Also in Model "B" with 46" diameter



MODEL "J"

Write for details of these and other Whiteman products

Write for full details and name of nearest distributor . . . of Whiteman Concrete Equipment, including Rodding Machines, Grill Tamper, Screed Stakes! There's a distributor near you.

Whiteman CONCRETE EQUIPMENT
WHITEMAN MFG. CO.
3249 Casitas Ave., Los Angeles 26, California



Heavy-duty trailers from 5 to 100 tons

SAFE FOR THE BIGGEST LOADS

HAULING CONTRACTORS everywhere depend on Jahn Heavy-Duty Trailers for safe, fast and economical moving of their heaviest loads like this 110,000-lb. transformer. Deep, wide flange main beams run the full length of the trailer. Cross-members and outriggers are I-Beam sections. Improved, fabricated gooseneck adds greater built-in strength. Positive, self-equalized braking at each wheel regardless of position of axle assures maximum safety. See your nearest Jahn dealer for details.



C. R. JAHN COMPANY
1347 WEST 37th PLACE, CHICAGO 9, ILL.



Owen Buckets can be dropped with entire weight on teeth points or cutting edges. Hard surface penetration is assured with an unusual amount of material between jaws before closing power is applied.

Closing power is efficiently transformed into digging power and proper shell curvatures permit easy sliding entrance and spilling of material.

THE OWEN BUCKET COMPANY
6030 BREAKWATER AVE. • CLEVELAND, OHIO
BRANCHES: New York, Philadelphia, Chicago, Berkeley, Calif.

Keep On

BUYING BONDS

★ ★ ★ ★

DON'T SKIMP!

Contractor Moves 2,150 Yards Daily

2-Mile Section of County Road Relocated and Rebuilt To Provide More Adequate Route Through Hilly Country

ALONG 2 miles of rolling farm country north and east of Lake Geneva, Wis., two scrapers last autumn averaged 2,150 cubic yards of dirt daily as the Walworth County Highway Commission moved to bring more county roads up to modern standards.

The contract for 9,017 feet of reconstruction and relocation of County Road MN was awarded to Alvin Voigt of West Bend, Wis. Included in the contract were 22,781 cubic yards of unclassified excavation; 7,777 cubic yards of ditch excavation; 3,500 cubic yards of gravel surfacing; and 10,560 square yards of seeding.

County Highway MN over this 2-mile section is a busy road, providing a diagonal cut-off connection between two surfaced county highways and serving a number of farms in the area. The width of the old roadbed, however, was only 20 feet. And over the 2-mile distance, two curves which were almost blind constituted traffic hazards.

A Safer Highway

This rebuilt section of Highway MN is now a safer and better road. Its shoulder-to-shoulder width is 30 feet, with a gravel wearing surface of 26 feet. Narrow ditches which flanked the old road have been replaced with spoon-type ditches, and slopes are 3 to 1 on fill sections and 2 to 1 in cuts. The two bad curves have been relocated through two new cuts, comprising the principal relocation item in the contract. One cut for 800 feet at an average depth of 7 feet contained 16,500 cubic yards of excavation; and another sidehill cut extending for 500 feet contained approximately 3,000 cubic yards of excavation.

The contractor averaged 2,150 cubic yards of excavation daily, and required only about 6 weeks for completion of the contract. Harry Nelson of Elkhorn, Construction Engineer, and Les Helbing of Juneau, Grade Foreman, supervised the work for Alvin Voigt.

Equipment

This project was typical of the profitable breather or fill-in work, requiring only a small amount of equipment, which county jobs often offer. Alvin Voigt handled the unclassified excavation for the rebuilt county road with two Caterpillar D8 tractors and LaPlant-Choate 13-yard scrapers. In the hands of experienced operators, who often can be kept busy on such work when other contracts lag, the scrapers carried heaping loads of 16½ cubic



C. & E. M. Photo

Filled by a D8, this LaPlant-Choate 13-yard scraper is heaped to a 16½-yard load. Contractor Alvin Voigt moved 2,150 yards daily with two such units.

yards. The fill was dumped in scraper-load lifts and shaped with an Adams leaning-wheel grader pulled by a Caterpillar D7 tractor. The only other unit on the job was a Lima ¾-yard Paymaster dragline which moved 7,777 cubic yards of dirt for ditches.

The only compaction obtained on this grading job through Wisconsin clay and loam was from passage of the heavy

crawlers over the rebuilt grade. The new grade was topped with a wearing surface of 3,500 cubic yards of gravel which was purchased from a local gravel plant.

Preventive Maintenance

Contributing to the successful completion of this profitable small job was not only the experienced 8-man crew

which worked a 10-hour shift daily, but care of the equipment as well. Expensive breakdowns were prevented by thorough checking and servicing of equipment. Although on a contract of this size it is not profitable to employ a full-time mechanic, it is possible for the construction engineer and superintendent to supervise personally the maintenance of each unit by the operator.

The tractors were lubricated daily by the operators with Alemite guns; cables on the scrapers and on the ¾-yard Lima Paymaster dragline were carefully inspected for signs of wear or for breaks. The preformed-wire-rope cables on both scrapers and the dragline really required a minimum of attention and the job was free from disturbing time-out because of cable breaks.

Personnel

The county project was under the supervision of the Walworth County Highway Commissioner, H. J. Peters, Elkhorn.

FIRST CHOICE OF

Veteran DRIVERS

GMC trucks are preferred by veteran drivers . . . old and young. They are the choice of men who have operated commercial vehicles for years, just as they are the choice of veteran G.I.s who put GMC military vehicles through unbelievably tough hauling assignments on battlefronts all over the world. GMCs are favorites of these men who know trucks because GMCs can be counted upon to perform powerfully, economically and dependably . . . mile after mile, day after day. They are favorites because they are all-truck built, with truck axles, transmissions, clutches, frames and brakes, plus engines of the same basic design as that used in nearly 600,000 "Army Workhorse" GMCs. There's a model ideally suited to your job . . . to every hauling job, large or small. If you want a truck that can take it, take a tip from veteran drivers. Choose a rugged, war-proved GMC!

THE TRUCK OF VALUE

GASOLINE-DIESEL

½ TO 20 TONS



GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION • PONTIAC, MICHIGAN

FOR SECONDARY ROAD CONSTRUCTION...

ARIENS AGGMIXER

The swirling, chopping action of these tines does a thorough job of mixing, wet or dry.

Here's equipment designed especially for mixed-use construction—to operate in connection with other general purpose equipment. Wherever aggregates are used it thoroughly pulverizes, mixes and loads. Also ideal for soil cement stabilization. Safe and easy to operate . . . adjustable to any tractor . . . 4 standard sizes, 4', 5', 6' and 7'. Write for details.

ARIENS COMPANY BRILLION WISCONSIN



A weight reduction of 5,000 pounds has been achieved by fabricating this machinery trailer of high-tensile-strength steel, says Pointer-Willamette Co., its manufacturer. Increased pay loads are the result, it points out.

Lightweight Trailer Increases Pay Load

A lightweight drop-deck machinery trailer has been announced by the Pointer-Willamette Co., 238 N.E. Oregon St., Portland 5, Oreg. Fabricated from high-tensile-strength steel, it is said to effect a weight reduction of approximately 5,000 pounds, thereby adding to the effective pay load which can be carried.

The Model P-W unit has a rated capacity of 25 tons, an overall length of 35 feet, and a total weight of 10,900 pounds. The loading deck is 17 feet 4 1/2 inches long, 28 1/2 inches high, and is made of 2 1/2-inch oak. Ground clearance is 11 inches. The wheels are 20 x 9/10 Budds, and the tires required are 11:00 x 20, 12-ply.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 2.

Bridge-Flooring Design

Features Reduced Weight

Savings up to 30 per cent in the weight of steel beams used in concrete bridge decks are said to be made possible by a relatively new design in which the steel beams are interlocked with the concrete slab. This "composite construction" was described before the annual meeting of the American Society of Civil Engineers by C. P. Siess, special research associate professor of theoretical and applied mechanics, University of Illinois.

Mr. Siess has been conducting analytical studies and laboratory tests on this design. It provides for a rigid connection between the concrete slab which forms the roadway of the bridge and the steel I-beam on which it rests. He emphasized that it enables bridge builders to obtain greater stiffness in the structures. This is accomplished by welding steel clips to the tops of the beams and imbedding them in the concrete as it is poured, instead of the usual practice of resting the slab on top of the beams.

"Composite construction," he declared, "permits the use of a lighter beam than would usually be required, and in many instances permits the use of a shallower beam. Moreover, even with a lighter section, the stiffness of the composite beam will be from two to three times as great as the stiffness of the original non-composite beam."

Asphalt Tank-Car Heater

The Grace Rapid Fire combination circulating and steam heater for tank cars of asphalt is described in literature of the W. E. Grace Mfg. Co., P. O. Box 9066, Dallas 1, Texas.

The heater catalog discusses the ad-

vantages of having both steam and circulating heat available, and when it is advisable to use each. It features a large two-page cutaway drawing of the heater and its method of operation. It shows by means of arrows the flow of heat and asphalt through the heater, and points out the important features of construction. There are several sectional views of the burner, and the last page is devoted to specifications.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 74.

RR-Crossing Gate Is Mounted on Flasher

The development of a railroad-crossing safety gate has been announced by The Buda Co., 15412 Commercial Ave., Harvey, Ill. The Model 71 safety gate can be mounted on any standard 4, 5, or 6-inch signal or flasher post. It conforms to American Association of Railroads and state highway department requirements governing visibility, construction, and operation, according to the manufacturer.

The Model 71 gate can be operated automatically by means of track relays, or manually by remote control. Running on six-cell batteries, the motor is said to be able to handle gates with arms up to 40 feet in length. When the gates are being lowered, the motor operates as a generator for restoring energy to the batteries. In case of power failure, the gate lowers automatically by gravity. The motor may be run directly on ac voltage if desired. By one adjustment the gate may be set for 90,

80, or 70-degree operation without individual adjustment of switches for timing.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 47.

Truck-Mounted Loader

A catalog describing its portable truck-mounted loader is available from the Eagle Crusher Co., Inc., 124 No. Washington St., Galion, Ohio. It is designed to handle all kinds of loose materials such as gravel, stone, cinders, snow, slag, loose dirt, sand, and coal. It loads from stockpiles into trucks or unloads from hopper-bottom cars onto stockpiles or trucks.

Bulletin CE-472 lists the various operational features of the loader, as well as specifications for buckets, spiral feeder, safety clutch, frame, and for the truck and power take-off needed.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 66.

TORQUE CONVERTER TRACTORS

WHAT THE MEN WHO OWN THEM SAY:

MIDWEST OWNERS

Tried, tested, proved! First Torque Converter Tractor led to purchase of seven additional units. More on order.
S. A. Healy Co., Chicago, Illinois

"Have 12,000 hours on our Torque Converter Tractor and it is still in good condition. Has moved many thousands of yards of dirt with minimum repair cost."
De Ruyter Brothers, Willmar, Minn.

"Less shifting feature is appreciated by operator. Steering clutches last longer. Tractor requires less servicing because shock is absorbed."
John Dehner, Fort Wayne, Indiana

"Ability to constantly increase motor power without 'clutching' cannot help but reduce to no small extent, the wear and tear on transmission and drive."
Schuermann Building & Realty Co., St. Louis, Mo.

WESTERN OWNERS

"Not interested in any tractor that does not have Torque Converter."
John Iben, Phoenix, Arizona

"Easier and smoother operation. Less breakage of either pulled or pushed machinery or cable. Use two units—pull scrapers, land planes and rippers, clearing and leveling desert land."
Hanson Farms, Casa Grande, Arizona

SOUTHWEST OWNERS

"Torque Converter Tractor is finest bulldozer tractor ever built. We also use a Torque Converter Tractor with a scraper and haul more dirt faster and cheaper because of time saved shifting gears. Low upkeep on tractors and auxiliary equipment."
Olene Hanson, Houston, Texas

"Never had a tractor which moves dirt as quickly and cheaply as a Torque Converter. Got 3,000 hours on my first one and no trouble yet. Now own three."
Storms Construction Co., Pampa, Texas

NORTHWEST OWNER

"Get one-third more production and smoother performance than with conventional tractor. Less operator fatigue."
Wirkkala Bros., Naselle, Wash.

EASTERN OWNER

"Moves 20 percent more yardage, yet upkeep cost is about half that of conventional tractors."
Mills, Gorman and McAllister, Wendell, West Virginia

Like these users, you can lower cost, step up yardage moved with Allis-Chalmers Torque Converter Tractors. Here is "get up and go" performance with less gear-shifting. Operation is continuously smooth—starting, pushing, pulling. This all adds up to more work done, less maintenance, **MORE PROFIT!** Now is the time to investigate.

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This is one of the three models of small scrapers made by the Henry Mfg. Co. of Topeka, Kans. The struck capacities of the three models are 2.3, 3.8, and 5 yards respectively.

Small-Scraper Line

A line of three scrapers, Models G-3, G-4, and G-5, is made by the Henry Mfg. Co., 1105 4th St., P. O. Box 720, Topeka, Kans. These were formerly known as the Hi-Lo scrapers.

Model G-3 has a struck capacity of 2.3 yards and requires a tractor pull of 25 to 35 hp. Width of cut is 45 inches and depth is 6 inches. Overall length is 128 inches, overall width is 90 inches, and it has an approximate weight of 3,500 pounds.

Model G-4 has a struck capacity of 3.8 yards and requires a tractor pull of 40 to 60 hp. Width of cut is 54 inches and depth is 7 inches. Overall length is 145 inches, overall width is 102 inches, and it has an approximate weight of 5,160 pounds.

Model G-5 has a struck capacity of 5 yards and requires a tractor pull of 60 hp or greater. Width of cuts is 64 inches and depth is 7.5 inches. Overall length is 165 inches, overall width is 119 inches, and it has an approximate weight of 7,310 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 43.

Concrete-Curing Compound

The specifications for Tru-Cure concrete-curing compound are now available in printed form from the Truscon Laboratories, Milwaukee Junction Post Office, Detroit, Mich.

Folder No. 547 gives a detailed description of the procedure and equipment for running laboratory tests to see if the compound will stand up to minimum requirements, and also lists the standards for field applications. It is amply illustrated.

Truscon is also making available reprints of an article called "Recent Developments in Testing and Use of Liquid Concrete Curing Compounds". This article was written by R. E. Madison, Research Director, of Truscon.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 76.

Rock-Crusher Bulletins

The Series SL jaw crushers and the Series SGRB star-gear roll crushers are described in literature now being distributed by Universal Engineering Corp., 620 C Ave., W., Cedar Rapids, Iowa.

Bulletin 4C gives specifications, capacity ratings, and dimensions, together with cutaway and detail illustrations, of the SL jaw crusher. It is made in seven sizes. Bulletin 6A-2 provides similar information on the Universal roller-bearing star-gear roll crusher. It is built in three sizes.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 58.

Wood Expert Joins Teco

It was recently announced that Frederick H. Vogel, wood technologist, has joined the laboratory staff of the Timber Engineering Co., Washington, D. C. Mr. Vogel has just returned from the Amazon Valley jungles of Brazil, Bolivia, Colombia, and Peru, where he

carried on exploration for and studies of mahogany, cedar timber, and other forest products.

Interpretation, Writing Of Engineering Contracts

Of interest to contractors is a book which has just been published in its fourth edition. It deals with the interpretation and writing of contracts as they affect contractors. It aims to state in brief compass the guiding principles or intent of the law fundamental to a whole group of cases which involve engineering contracts. And it includes a discussion of the principles concerned with renegotiation of contracts.

"Contracts in Engineering" was written by James Irwin Tucker, B.S., LL.B., and is published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. Designed as a textbook, it can also be used for study or handy reference outside the classroom. Cost of the book is \$5.00 per copy, and it may be obtained from the publisher, or by writing this magazine.

You can quickly and profitably trowel a smooth, resilient, log-lived surfacing right over that old concrete or wood floor.



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crack, crumble, curl or loosen. Also patches concrete to a perfect feather edge. Heavy loads on steel wheels actually improve it. Five-year-old floors show no wear. Used by largest railroads and industries in America. Over 600 contractors have found Plastic Rock a good-will builder and profit source. No special equipment needed. Not for home use.

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Also see page 22

MULTIFOOTE
Duo Mix
(DUAL DRUM) 34-E

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MULTIFOOTE CONCRETE PAVERS, AND FOOTE KINETIC MIXERS

Portrait in Print

By RAY DAY

Contractor Bases His Philosophy On Keeping in Touch With His Men

★ "THERE is a difference between an engineer and a contracting engineer."

Those words are more than fact. They express the conviction that has long motivated a mysterious sloe-eyed builder who came to the United States not many years ago and has since skyrocketed to eminence in the west.

He is a man of many contrasts, this China-born Portuguese American. He is quiet and carries an air of secrecy; but he is affable and gracious always. Predictably unpredictable, he never exposes his hand in business; but he has never made a business enemy. He will labor day and night to perfect the fine details of some conventional method on a job, and then junk it all on the next project in favor of a radical new adaptation. He will push his men towards the goal of higher individual productivity, and then bleed himself to keep them on the payroll in slack times.

He will laugh with real embarrassment when you ask him about this, and say, "Well after all, there's some personal satisfaction that justifies it".

His name is Carlos Tavares, President of the Tavares Construction Co. Yet he is the kind of executive whom it is hard to find in his office. For the possibility of losing personal contact with his men means more to him than the growth of business. And personal contact to Tavares means muddy shoes, flying dirt, and the wham-wham-wham of a pile hammer in the still air.

His reputation for contrast runs true to form even in the location of his business. His headquarters office in La Jolla is in the midst of southern California's most beautiful and leisurely playground, near the tranquil Pacific. But he has enough contract work under way to keep most men busy from morning to night.

"It's a treadmill, all right, and planning properly the little details which are the difference between profit and loss takes up a lot of time," he will admit when questioned. But then his youthful energy shows up, for he is

only 41, and he adds, "Once in a while I get time for a game of tennis, though".

Many of the key foremen on his payroll have never missed a check in ten years. Pile-driver men like Bill Pace and Ralph Denny will switch over to a housing project and direct the digging of cesspools, if necessary. They swear Tavares is the most intelligent mathematician they ever saw. When insurmountable problems crop up, they never doubt that Tavares will appear on the scene, whip out a scratch pad, and sketch the solution in a few minutes.

Tavares debunks his boys' admiration by saying, "Sometimes those sketches

cause me to sweat for days".

But over a period of time Tavares' inventions and adaptations of technique have built for him a string of legends. It is difficult to find where fact ends and fiction begins. Start checking up, and you find that fact is always fact, and that often fiction is fact! More than once on a Tavares job competing contractors have stepped out of their automobiles, taken a look, and exclaimed in admiring amazement, "How in hell does he do it?"

Foreign Background

The secret is as old and complicated as the centuries-old civilization of China. Tavares began to learn it in Shanghai in 1905, where he was born to Portuguese parents. His father was one of the best lawyers in the Orient. And the son's brilliant mind profited from the Shanghai school system where he was taught how to think instead of what to think—still the principal difference, perhaps, between China's educational goals and our own. Learning how to



The inventions and techniques of China-born Carlos Tavares, President of the Tavares Construction Co., La Jolla, Calif., have skyrocketed him to eminence in western construction.

think started him off on that solid foot.
(Continued on next page)

SUCCESSFUL Contractors watch the pennies

That's Why So Many Choose
MICHIGAN
THE PIONEER AIR-CONTROLLED
TRUCK-TYPE SHOVEL-CRANE

**The Lighthouse
of the Highway**
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SAFETY BEAM

Order through Your Jobber
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POWER SHOVEL COMPANY
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Contractor's Rule Is Contact With His Men

(Continued from preceding page)

ing which today is the basic secret of success when he departs into new and untried construction methods.

"I suppose I wanted to be an engineer as long as I can remember," he explains. "But not an ordinary engineer. There isn't much romance getting stoop-shouldered over a desk. I wanted to be a builder, a creator of construction, and I felt that the contracting field offered the widest possible opportunity to achieve that goal.

"Today that same opportunity is more a challenge to young men than ever. I can think of no field, no profession or study, that offers as much opportunity for advancement and satisfaction as construction."

In 1923 Tavares bade his family goodbye and traveled to the United States. Four years later he graduated with honors from Notre Dame University. Planted in his mind were mathematics and chemistry and English and all the other seeds of knowledge in the solid background of a good engineer. Tempered by his earlier background of Chinese thoroughness, the seeds of knowledge were destined to sprout forth again and again, always producing something usable.

He graduated from Notre Dame with something else: an overpowering curiosity to learn about American construction equipment. He visited distributors and factories. He spent weeks in a pile-hammer factory learning all there was to know about the construction, operation, repair, and maintenance of all types of hammers.

"Just how I was going to get American equipment after I got back to China was indefinite, but at least the United States had shown me some machines we might try to build ourselves, if necessary," he explained.

Pile-Driving Ritual

Today, 20 years later, Tavares recalls the enormous contrast between methods of construction here and those to which he returned when he left South Bend.

"On my first pile-driving job back home we observed the strict ritual practiced in China for centuries. This ritual calls for a sacrifice.

"When the first pile in a job is set in place, the hammer hits it just enough to set it a few feet in the ground. The hammer is hoisted up. Then an animal—we usually used a live rooster—is killed by cutting off its head. And the executioner lets the blood from this sacrifice drip down over the piling.

"Everyone else is busy. The pile-driver whistle shrieks, men applaud, they crowd over each other. It's a wonder somebody isn't killed.

"Work stops for that day after the sacrifice. The crew and the superintendent retire some place for a feast, with plenty of drinks and fun for all. Not until that ritualistic orgy is over will work be resumed the next day."

When this writer asked him whether such a ritual was observed in America on Tavares jobs nowadays, he said, "You ought to know. You were at Sepulveda Dam". Sure enough. Memories of that job came flooding back.

Tavares had designed two new pile drivers, the Lexington and Saratoga, to handle 60-foot H-beams with 12-inch webs. They were the last word.

The first steel pile was set in the Saratoga's leads. A few blows started it down. The engineer reached up to cut off the steam. There was no live rooster dripping blood, but there was Mrs. Bill Pace with a bottle of champagne, and she broke the bottle on the steel pile! The champagne ran down the steel webs, the American flag was

hoisted to the top of the 130-foot-high leads, and the first pile was slammed down to 60 tons of bearing.

We quit work for the day then and there! We drove a few miles to a private home, where the crew feasted and drank and talked pile driving. Long after midnight the party broke up. It is hard even to connect that little gathering with a bloody rooster and primitive sacrificial rites. For it did more to weld the gang of pile-driver men together than anything else could have done. Next day a team, knit by friendship, started setting pile-driving records which still stand.

When Tavares says now, "I think it's unwise for a contractor ever to get so big that he loses personal touch with his men," the statement takes on a new significance. It might even be the secret of efficiency in his organization, or the cause of lost man-day production in an organization without it.

Work in China

When Tavares returned to China in

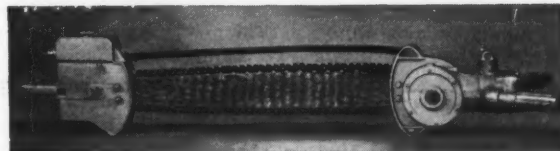
1927, he found a country sorely in need of engineering talent. Great bridges had to be thrown across waterways. Docks, wharves, and foundation work of all types were needed. Tavares started in as a foreman of a crew, and progressed through various stages until

he reached a contracting partnership.

It was within this ten-year period that Tavares learned so much about improving and inventing. For when a construction job was started in those days the contractor did not exactly go

(Continued on next page)

Cuts Piling 12 Times Faster Than Hand Sawings



That's the experience of a prominent Chicago organization with the new Lombard air saw. Six average 14" diameter piles were cut in 7 seconds—normally would take two men with hand saw 1½ hours. Weighs only 46 pounds. Demonstrations available by local dealers in most states. Immediate delivery on air, gas and electric units.

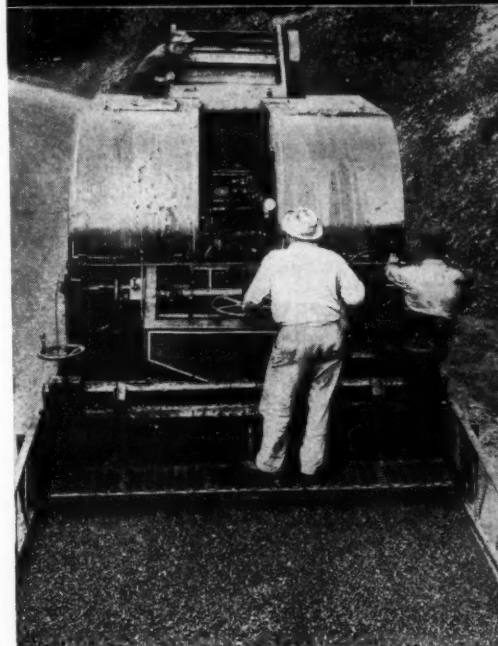
LOMBARD CHAIN SAWS

Lombard Governor Corporation

Ashland, Mass.

At Right: Moto-Paver mixing and laying retread pavement over old bituminous macadam in West Virginia.

Below: Rear view showing positions of the men usually used in operating the Moto-Paver.



For resurfacing secondary roads and city streets ...
Also for new construction

● The H & B Moto-Paver is especially adapted for resurfacing secondary roads and city streets, but is also highly efficient on new construction. Here, for the first time, is a self-contained, single-unit machine which accomplishes the entire mixing and laying job in one continuous operation. The Moto-Paver delivers the mixed material spread and struck off on the road surface, ready for rolling. Paving width is adjustable from 8'6" to 12'0", and thickness up to a maximum of 7". The strike-off blade is

adjustable to hold accurately to specified grade and crown.

The Moto-Paver has been successfully operated using gravel, stone or slag aggregates, and with most types of emulsions, RC, MC, and SC asphalts and tars. Illustrated bulletin giving complete information and specifications will be sent on request.

HETHERINGTON & BERNER INCORPORATED
731 KENTUCKY AVENUE, INDIANAPOLIS 7, INDIANA

H&B Moto-Paver
THE COMPLETE TRAVELING MIXER AND PAVER

Contractor's Rule Is Contact With His Men

(Continued from preceding page)

down to the nearest distributor and take delivery on a crane or whatever he required. It was not quite that simple.

It was up to him to scour the country, and then to devise something out of whatever he could find which would do the job. Thorough and exhaustive studies had to be made of each job, and of all possible construction approaches which might work. Figuring the solutions to these problems became a kind of second nature to Tavares. And today those lessons crop out in his originality of approach.

At the mouth of the Ching Tang River stands a bridge, carried on 16 piers, which Tavares finished at the start of the Chinese-Japanese war.

"This one was the toughest job we ever did, from the standpoint both of straight engineering and of construction itself. The bridge piers had to be built with pressure caissons across a body of water subject in the equinox to gales and bores." Tavares explained that a bore is a tidal wave, which breaks in the estuaries of only a few rivers in the world. Impeded by the narrow channel of this river, the water rose in a mighty ridge 25 feet high and coursed upstream with great force and noise.

"Some of its force would dissipate before it reached our caissons, but even so we had 7-foot tidal waves," he recalled. "A 7-foot wave has great force. A bore snapped 3-inch-diameter steel cables like strings one afternoon, and one of my caissons floated off location. We were lucky to save it and tow it back."

Japanese bombers were already plastering the Hangchow airfield when Tavares finished the bridge and saw the first train pass over the new structure. He then faced one of the cruelest decisions of his life. Uncertain as to China's fate in the war, and knowing that hostilities were starting, Tavares came to America to work, leaving his father, mother, and sister in Shanghai.

His father lived to see China emerge as one of the great nations in the Far East, and as this is written his mother and sister are enjoying the La Jolla Tavares is too busy to enjoy.

"I believe they like California as much as I do," says this man who has no Chamber of Commerce connections.

Work in the U. S. A.

Tavares came back to the United States in 1937, landing at San Francisco on the heels of a bad economic depression. With the same lack of regard for precedent which he had to show in the Orient, he set himself up in the contracting business.

How well has he succeeded?

Go to the officials of the Ford Motor Co. at Long Beach, Calif., and mention the name of Tavares. "Sure we know him. He drove all the foundation piles under our big assembly plant here. And finished up ahead of time too..." will be your answer.

Up on the Columbia River above Bonneville Dam the natives for miles around remember how Tavares Construction Co. raised the Bridge of the Gods 50 feet. To them it is one of the biggest things ever to happen there. But Tavares old-timers marvel still more because this young contractor proved that the bridge could not stand the strain without extra bracing. And he had to sell this fact to the people who were paying for the job!

When he landed a Navy contract for pier work at the San Diego Naval Base, the job called for the biggest size of concrete piles ever to be used there. Tavares designed and built a super floating pile driver. It would do just about everything but go out in the

woods and cut down a tree. It captured the interest of a number of foundation contractors, but what is equally important, it drove the job out on schedule.

How well has he succeeded?

Go to any one of fifty key men in the Tavares organization and try to hire that man to work for you. Or make any disparaging remark about the organization, and the results of Tavares' local brand of the Golden Rule will become quickly apparent.

How well has he succeeded?

Go to the Navy Department or the U. S. Maritime Commission, and find out about Tavares' crowning achievement of the recent war; the construction of "The Great Stone Fleet" of concrete ships. Teaming up with two other firms, he helped found the venture called Concrete Ship Constructors. With Barrett & Hilp, this company built the great fleet of concrete ships which carried so many supplies all over the world.

The most unusual thing has perhaps never been told, certainly not by Tavares. In a time when cost-plus and

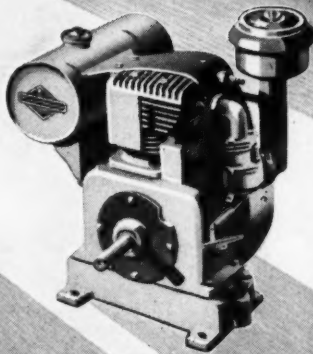
Government financing for almost any venture was the rule, Tavares quietly financed the development of Rocklite deposits in Ventura County. Specially processed under heat, this lightweight high-strength shale weighed only a third as much as ordinary concrete aggregates. When the call came for the construction of concrete ships, Tavares was ready with the aggregate deposit. And he was also instrumental in devising methods of pouring the thin-modeled walls of the hulls.

"Those two fellows came into my office and told me about this aggregate. Their faces were honest, so I invested some money. That's all there is to it," he will smile disarmingly. "Just remember that if it hadn't panned out everyone might be calling me a sucker!"

He is running some of that same aggregate into a few test concrete homes in San Diego County. The concrete houses, unlike some concrete structures, will not sweat. Costs on them run the same as on frame and stucco construction.

(Concluded on next page)

BRIGGS & STRATTON ENGINES



designed **RIGHT**
built **RIGHT**..
the **"RIGHT" POWER**
for your equipment

The experience of an organization which has produced more than 2 1/4 million air-cooled engines is built into every Briggs & Stratton engine. Theories or hopes do not dictate the adoption of designs, materials or manufacturing methods — actual experience and long testing do... The experience of users proves that Briggs & Stratton engines stand up under all kinds of service — year after year — proof that they are designed right — built right — the right power for your equipment.

BRIGGS & STRATTON CORPORATION
Milwaukee 1, Wisconsin, U.S.A.

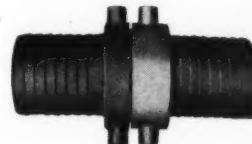


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Malleable iron (cadmium plated) or brass. Made to fit straight end hose. Two-way "Cor-O-Zig" Corrugations permit easier insertion in hose and assure tighter grip under clamp pressure. Sizes 1/2" to 8", inclusive.



"KING" SHANK COUPLING

For Suction and Water Hose

Durable, convenient, economical. Made in three styles—all malleable iron (cadmium plated); malleable iron, brass nut; all brass. Uniform in quality threading and dimensions. Sizes 1-1/2" to 8", inclusive.



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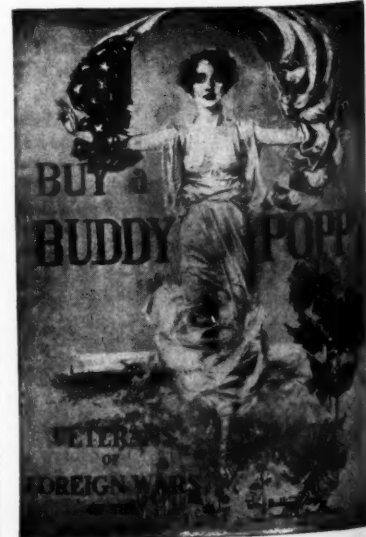
Made of malleable iron, cadmium plated. Easy to attach, and can be used over and over again. Tightening provides evenly distributed pressure around entire hose circumference. Double bolt style has quadruple take-up. Full range of sizes.

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IF IT'S A **DIXON** PRODUCT

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Contractor's Rule Is Contact With His Men

(Continued from preceding page)

tion. There are many contractors building homes in California these days, but Tavares is one contractor who is finishing his. He branched out into the house-building field recently to keep his men on the payroll and as busy as possible close to their homes.

"I don't ever want to branch out all over the country," he says. "One of the unhandiest things to have to carry around from California to Oregon is a pile driver!"

"When a business gets so big that it's impossible to get in your car and drive out to a trouble spot in an afternoon, there isn't any fun left in it. Most of this contract work differs by only two or three per cent . . . the difference between profit and loss. Unless a contracting engineer can help to plan the details—unless he knows what his men are up against all the time—he's liable to operate at a loss."

Philosophy of Efficiency

What Tavares might add is that he's a typical construction extrovert who likes to get out in the field to talk to his friends.

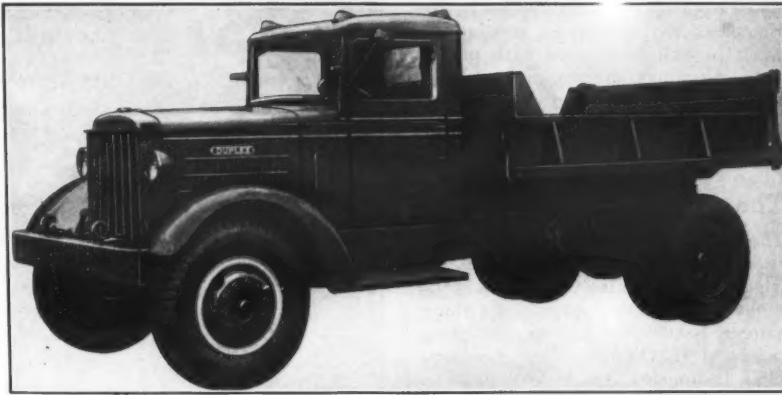
"Friendship is a great thing." That is the nucleus of his philosophy. "Friendship has organized labor both here and in China closer than any form of coercion could do. On the Ching Tang River Bridge friendship and family played a vital role. Certain crafts came from certain provinces. The sandhogs were huge bandits from the north. Concrete workers came from another province, and steelworkers from another. If you offended one, you offended all."

"Consider our own organization. One foreman has his friends; another has others. There is no more solid foundation for working together. I would no more think of switching a favorite worker of one crew to another gang than I would think of opening the sea valve on a floating pile driver."

From an ornate office in La Jolla Tavares directs his organization with skill, with patience, and with wisdom. An architect may ask him, "What do you think of this layout, Carl?" And in the field a rigger is likely to be just as free and easy in asking something about reeving a block.

And if you can't find him in his office or in the field, you may find this man, whose legend has already become an enigma in the west, designing some construction scheme out on a river in the stern of a rowboat. He has done so before. Or you may find him away from the treadmill, at home with Mrs. Tavares in La Jolla . . . or even taking time to enjoy California, out horseback riding with his three children.

For Carlos Tavares is still predictably unpredictable!



The Duplex Model R-H dump truck is rated at 4 to 5 tons, and is available in four wheelbases. Its engine develops 135 hp at 2,600 rpm.

Heavy-Duty Trucks

A line of heavy-duty dump trucks and prime movers is made by the Duplex Truck Co., Lansing 4, Mich. The Model R-H dump truck is rated at 4 to 5 tons, and its gasoline engine develops

135 hp at 2,600 rpm. It is available in 148 to 220-inch wheelbases. The transmission has five forward speeds and one reverse. A 2-speed axle is standard.

The Model K-HA is rated at 6 to 8 tons and its Hercules 6-cylinder gasoline engine develops 132 hp at 2,300

rpm. It is available in 148 to 202-inch wheelbases. It has five forward speeds and two reverse.

The Model T-H prime mover is rated at 3 to 4 tons and the engine develops 113 hp at 3,000 rpm. Wheelbases available are 142 to 220 inches. It has five forward speeds and one reverse. The Model J-HA prime mover is rated at 5 to 7 tons and its Hercules engine develops 121 hp at 2,200 rpm. Wheelbases available are 148 to 202 inches. It has five forward speeds and two reverse.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 38.

New Tool Firm Formed

A new firm to produce pneumatic tools for use in air and electric hammers has recently been formed. Robert T. Wooding's, Inc., 901 Century Bldg., Pittsburgh 22, Pa., will manufacture principally drill rods, moil points, and pneumatic chisels. A reconditioning service will also be maintained.

TELSMITH VIBRO-KING *new* ...a VIBRATING SCREEN for Mines, Quarries and Gravel Plants

After six years of development, Telsmith now offers the new Vibro-King. To be sure they were right; 25 of these new screens were placed in operation in regular plants from coast to coast. During this test period—lasting four years—they handled all kinds of aggregates, under all sorts of conditions.

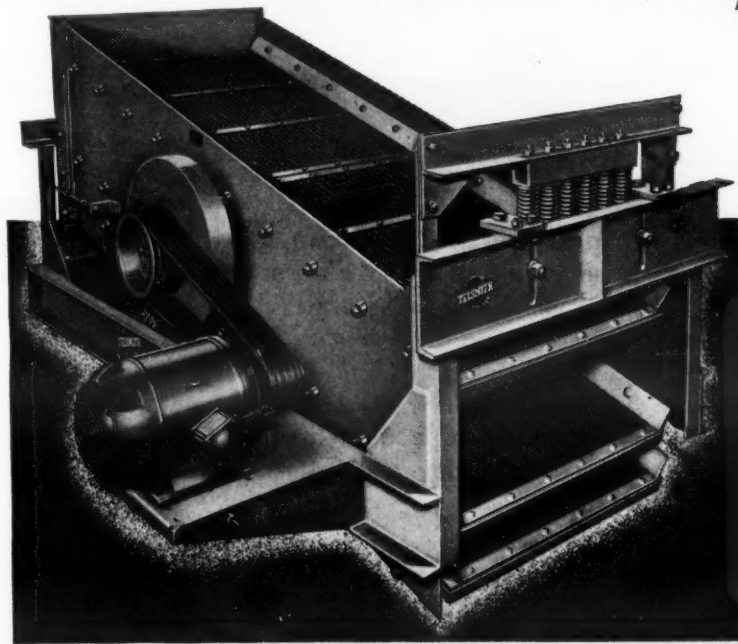
The first Vibro-King . . . sold in 1943 . . . is still running perfectly. Only the screen cloth was replaced. Not one of the others has had any major repairs. The high efficiency, freedom from shut-down, and exceptionally low upkeep of the Vibro-King have been tested and proved. Every user, without exception, is very well satisfied.

The Vibro-King has an intense circular vibration, uniform

everywhere on the screen cloth, on all decks, and constant under any load. The vibrating unit is mounted on two heavy-duty roller bearings, in the center of the live screen frame. Two Telsmith-designed-and-patented, automatically adjusted, enclosed counterweights prevent "jumping" at critical speeds and assure exceptionally smooth performance at all operating speeds.

The main frame is horizontal for rigidity and ease of installation. Cable suspension, if desired. The vibrating frame floats on three nests of springs. Adjustment to the most efficient screening angle is quick and easy. Vibro-King Screens are made in five sizes, with 1, 2, or 3 decks.

For details, send for Bulletin V-34.



Changing Screen Cloth Is Simple and Quick—

The upper end of the Vibro-King is readily removable, making it a much easier job to change screen cloth and saving a great deal of time.

Screen Cloth Mounting—At customer's option—screen cloth may be mounted in rubber on steel screen trays; or stretched over steel screen supports protected by rubber—on any deck or decks. V-1



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The Tonton tractor cable made by Wind Turbine Co. can be used as a slip noose or tow cable. The cable can also be furnished with a sliding choker hook.

Heavy-Duty Cable Tows, Hauls, Pulls

An all-purpose tractor cable for heavy-duty towing or pulling has been announced by the Wire & Cable Division, Wind Turbine Co., West Chester, Pa. Made of $\frac{1}{2}$ -inch 6 x 19 improved-plow-steel wire rope, the Tonton cable is said to have a minimum breaking strength of 20,000 pounds. It is available in 10, 12, 15, 20, 25, and 35-foot lengths.

The Pres-Tite cable connections holding the thimbles are said to eliminate undesirable features of a splice. The thimbles are designed to fit through each other, permitting the cable to be used either as a slip noose or as an ordinary tow cable. The cable can also be furnished with a sliding choker hook, upon request.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 21.

Parking-Problem Review Issued by Traffic Group

The problems of parking are a major concern and, in most cases, a major headache to all men concerned with highways. Some aspects of parking demands and practices developed to deal with them are discussed in a booklet called "Parking" and prepared by The Eno Foundation for Highway Traffic Control at Saugatuck, Conn. Wilbur S. Smith and Charles S. LeCraw prepared it, and it is a revision of the initial parking study made by the Foundation and originally published in 1942.

Dealing largely with urban parking problems and habits, the booklet also devotes an entire chapter to the prob-

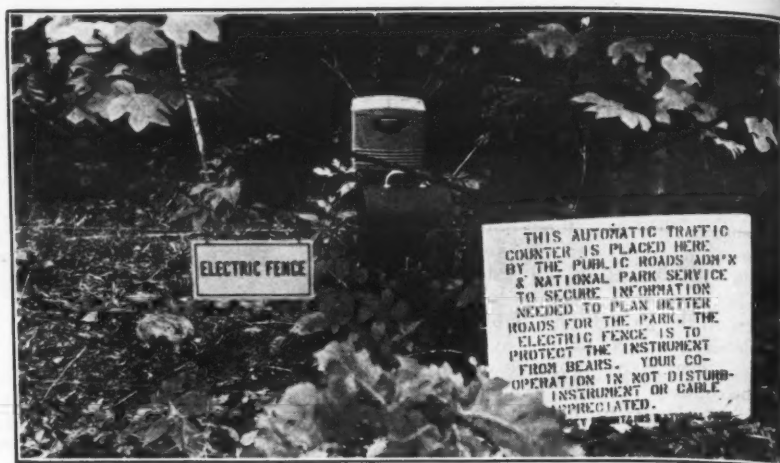
lems of parking on rural highways, the seriousness of unenforced regulations, etc. It is well illustrated with photographs, drawings, graphs, and tables.

Copies may be obtained upon request from the Eno Foundation, Saugatuck, Connecticut.

The Indispensable Pump

The most widely used machine in the United States is not the automobile, the refrigerator, or the telephone, but is the commonplace pump. At present there are over 100,000,000 in use, according to Richard H. DeMott, Vice President of SKF Industries, Inc., of Philadelphia. In an industrial report Mr. DeMott compared this total with 34,000,000 automobiles, 19,792,000 refrigerators, and 27,800,000 telephones reported in use in this country at the end of 1946.

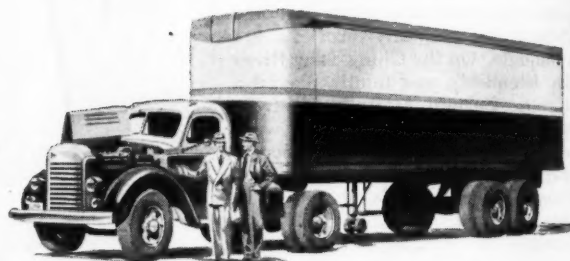
The centrifugal pump, invented 215 years ago by the Frenchman, LeDe-mour, is the most commonly used type of pump, according to the report. In addition to its customary uses in con-



BEARS, BEWARE! This traffic counter, one of several set up recently by the Public Roads Administration in the Great Smoky Mountains National Park where bears are numerous, is protected by an electrically charged wire fence designed to keep out prowlers. Current for the fence is supplied by a small portable battery chained to the tree on which the counter hangs.

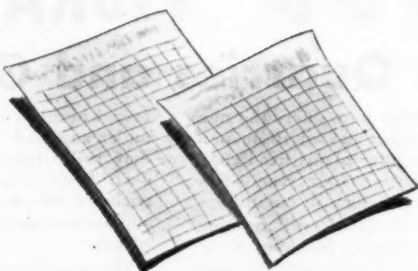
struction, its diverse usages include the pumping of soup, castor oil, chocolate syrup, catsup, as well as industrial coolants and similar liquids.

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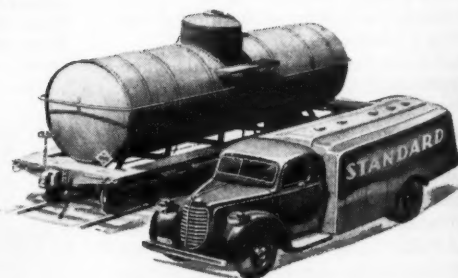
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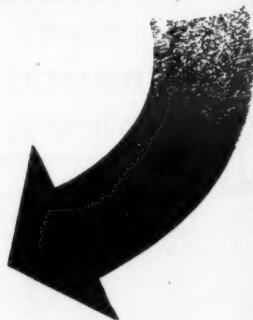


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STANDARD OIL COMPANY (INDIANA)

STANDARD
SERVICE

State Hits New High In New Mileage Paved

Adds 1,021 Miles of Paved Highways in Past Season; Work Done Both by Force Account and Contract

• NORTH Carolina, in the first complete construction season since the war, has added to its state system of highways 1,021.68 miles of paved surfacing. This gratifying new mileage is in sharp contrast to the preceding year, 1945, when only 30 miles of bituminous surface treatment were added as new pavement. The 1946 total was contributed both by contract and by the State Highway Commission's maintenance crews on a force-account basis. Cold weather halted further operations at the new high mark (the last previous high was in 1940 when 578 miles of surface treatment was completed). So 380 miles of surface treatment that were under contract had to be carried over for completion this spring.

Of the 1,021.68 total, 811.45 miles are the type classified as bituminous surface treatment. Of this 479.76 miles were done with state forces and equipment and the remaining 331.69 miles were done by contract. The other 210.23 miles which make up the total of new work are plant-mix; all of that mileage was done by contract. Up until 1942, when the war put a stop to this type of work because bituminous materials were at a premium, the State did a certain amount of plant-mix by force account. Since then, however, experienced plant operators have been difficult to obtain for the salaries the State can offer. So the plant-mixing and spreading in 1946 was done entirely by contract.

During 1946 contractors had 12 hot-mix plants scattered throughout the 10 divisions of the Tar Heel State. At peak production each of these plants was getting out about 500 tons of material every day for a total of 6,000 tons daily production. About one-half of these plants had just been newly moved into North Carolina, and the majority were busy at work from April 1 till the end of September which is the "open" season for black-topping.

Types of Work

This new mileage constitutes roads which had never been paved before, such as the ordinary dirt or soil type, and a limited amount of new location. All of the new paving was laid on a base course such as soil where the sand-clay is blended, or on soil-cement, or on traffic-bound macadam. The use of soil-cement base course was particularly marked this past year when over 100 miles of this type of construction were completed, with some additional mileage carried over into 1947.

The use of soil-cement as a base course was set up by the Commission in competition with traffic-bound macadam. Either type is 6 inches thick. Because of the great difficulty in procuring necessary stone for the macadam type of base, the soil-cement base course could be built at a lower figure. And this despite a requirement that the soil-cement base be constructed one foot wider than the macadam course to prevent any ragged or rough edges along the finished pavement. The base courses are 19 to 21 feet wide to support a pavement surface of 18 to 20 feet; most of the new paving has been laid 20 feet wide.

Whenever possible, the work was let by contract with the average section about 5 miles long. Jobs that were not suited for contract awards, as in localities which were short on suitable materials and where contractors could not submit a suitable bid, were done by

force account. The latter method was also employed on short sections on which the contractors failed to show interest, or when they were so occupied that they could not take on additional projects.

The soil-cement base was usually topped with bituminous surface treatment, although 100 pounds of sand-asphalt plant-mix per square yard was used on several jobs. In preparation for the black-top, the base was first primed with 0.25+0.30 gallon of MC-O asphalt to the square yard. This was cured anywhere from 24 to 36 hours, depending on the weather, before the inch of black-top was added by mechanical spreaders.

On the bituminous-surface-treatment work the past procedure had been to

use a tar prime on top of the base course. With strikes and walkouts in the steel and coal-mining industries over the past year, the production of tar was slowed considerably, and an adequate supply of RT-2 or RT-3 could not be obtained. Consequently some of the prime was put down with asphalt instead of tar. MC-O asphalt was first applied at the rate of 0.3 gallon to the square yard as a prime. This was followed with a 0.4-gallon application of AP-O (150 to 200 penetration) asphalt to the square yard. This was then covered over with 40 pounds of No. 10 aggregate which is graded from 1 1/4 down to 1/2 inch in size. The stone was spread through tail-gate spreaders to a one-stone thickness, which is about 3/4 to 1 inch.

On top of this first surface treatment went a seal using 0.4 gallon of RC-1 or RC-2 per square yard. The aggregate for the seal consisted of 22 pounds per square yard, graded from 1/2-inch size down to No. 16 screen. A broom drag then was pulled over the aggregate



"Surre an' it's drunken drivin' I'm arrestin' ya fer! Even your machine is staggerin'!"

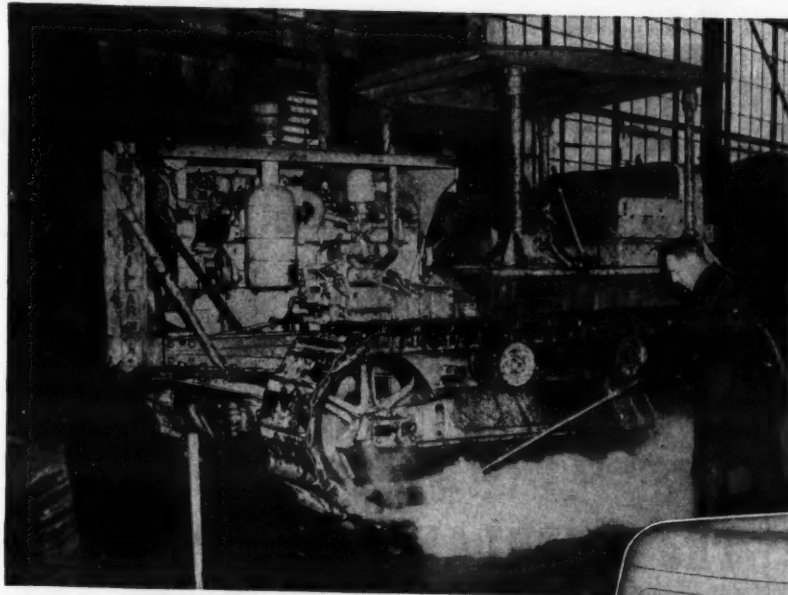
which was later rolled. After a 24 to 36-hour curing period the road was ready for traffic. This type of work was started on April 1 and continued until October 15.

(Concluded on next page)

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State Hits New High In New Mileage Paved

(Continued from preceding page)

Hot and Cold Mixes

For the 210.23 miles of new pavement using hot-mix, 202,686 tons of material were required. In addition to this a total of 413,088 tons of the same material were used in resurfacing, which was also done solely by contract. The thickness of pavement varied according either to the traffic using the road, or to the condition of the base in the case of a resurfacing job. The heaviest type of resurfacing on old pavement consisted of 1½-inch binder course and 1-inch top, while in some instances a satisfactory pavement was obtained with from 1 to 1½ inches of top material only. In the latter cases from 100 to 150 pounds of material were required for the square yard.

The cold-mix work was done by state forces and included 39.12 miles of re-tread. This is the construction of a bituminous mat on an old pavement by mixing in place cut-back asphalt with either sand or stone for aggregate. Some of the new mileage by state forces also included mixed-in-place sand-asphalt and tar-stabilization pavements. A greater mileage of this type of work is expected in 1947 with the additional equipment recently acquired by the Highway Commission. Sand-asphalt pavements will be constructed in the eastern part of the state, where the soil conditions are favorable, with three Wood Model 36 Roadmixers. Throughout the state will be 15 Seaman Pulverizers to be used primarily for sand-clay or soil-cement stabilization on base courses.

Contract work will also be increased in 1947 with a letting of bids scheduled for every month in the year. Even in January 122 miles of new mileage contracts were awarded. This early date has enabled the contractors to get under way with the advent of favorable weather, after getting their equipment in shape and materials ordered during the late winter lull.

The costs of this work last year when let by contract were as follows:

Soil-cement 6-inch base course	70-90 cents per square yard
Bituminous surface treatments	30-33 cents per square yard
Hot-mix	\$4½ - \$7½ per ton

(The hot-mix cost figure depended on the availability of local materials, with an average of \$5½ per ton spread in place.)

Aggregate Supply

This great amount of road work in North Carolina naturally meant that huge tonnages of sand, stone, and gravel had to be available for the use of state forces for the surface treatments, traffic-bound macadam, and stabilization work. Last year 778,909 tons of sand were taken from creeks by draglines for blending with clay in the construction of base courses. Also 980,880 cubic yards of topsoil were stripped to provide the natural sand-clay material for base courses which may be from 6 to 12 inches thick, according to the traffic the road is expected to carry. For insulating courses in bituminous surfacing a thickness of 3 to 4 inches is usually sufficient. This material was all furnished by the state maintenance forces.

They also crushed a considerable amount of stone in state quarries and with their own equipment. A total of 1,138,954 tons of stone was crushed and put on the roads, with an additional 72,628 tons put in stockpiles. So much was needed, however, that the Highway Commission contracted for more stone to be crushed, with 1,109,655 tons put on the roads and 196,314 tons in stockpiles.

These contracts were usually let in 40,000 to 60,000-ton quantities. And in

many of them an arrangement was made whereby the contractor moved his crushing equipment to a state-owned or state-furnished site and took the material from there. This, of course, was more economical than if the contractor also had to supply the quarry. The cost of this crushing of state-owned stone varied from \$1.37 to \$1.65 per ton. Contracts were also negotiated by the Commission for delivering the stone to the job sites at a cost of from 7 to 9 cents per ton-mile. Some gravel was also purchased by contract, with the supplier delivering the material to stockpiles at a cost of \$1.20 to \$1.55 per ton.

This year the Highway Commission hopes to have additional new crushing equipment in state-owned quarries. Although ordered as early as February, 1946, some of these units have not yet been delivered. They will comprise 18 x 36-inch primary jaw crushers, with a 36-inch cone-type secondary crusher, and two-unit portable plants with 20 x 36-inch primary crushers and roll secondary crushers.

A summary of the work follows:

	Miles of Road	
	By State Forces	By Contract
Drag retreatment	977.88	449.50
Retread	39.12	.....
Sand or straight seal	66.60	.....
New treatment	479.76	331.69
Widening	8.20	.....
Plant-mix, new paving	.....	210.23

Personnel

A. H. Graham is Chairman of the North Carolina State Highway and Public Works Commission of which W. Vance Baise is State Highway Engineer. B. W. Davis is State Maintenance Engineer and T. V. Fahnestock is Bituminous Engineer.

Tractor-Mounted Unit Drives Posts, Piles

A tractor-mounted unit which drives small piling, fence posts, etc., is made by the Northwest Tube & Metal Fabricators, 2658 S. E. Tenino St., P. O. Box 2310, Portland 14, Ore. With this unit it is not necessary to dig holes; the posts and piling are driven into the ground by power-driven hammer, power for which is furnished by a tractor take-off.

The Polesetter consists of a boom connected to a tractor, a hammer guide, and a driving hammer. In operation, the lower end of the post is first cut into a wedge shape to facilitate its entry into the ground. Then the boom is swung

into place, the hammer guide is placed around the post, and the hammer is dropped as often as is necessary to obtain the proper depth. Posts may be driven at any angle by adjusting the position of the hammer guide.

The standard boom is 10 feet long and will accommodate posts 8 feet long; longer booms can be furnished upon request. Overall height is 13 feet; weight, 375 pounds; weight of hammer, 260 pounds; and the diameter of the brake drum is 11 inches. The unit is said to fit most late-model tractors equipped with a power take-off.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 39.

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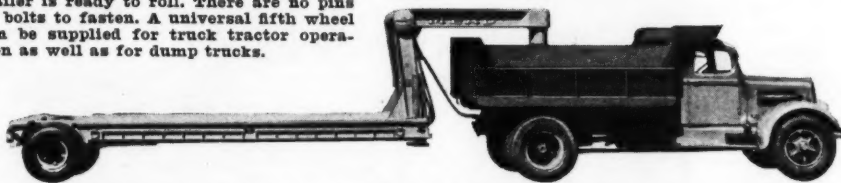
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Dirt-movers consisting of LaPlant-Chaste scrapers and Caterpillar diesel DW10 tractors haul material from a borrow pit for widening and resurfacing a section of highway in California. Fredrickson & Watson Construction Co. of Oakland, Calif., was the contractor. The scrapers loaded downhill on a 30 per cent grade, and made two trips an hour with a 7-yard load on a 4-mile haul.

Soils Engineer's Job In Highway Department

The organization of a soil-mechanics division in a highway department was discussed at the recent convention of the Association of Highway Officials of the North Atlantic States. Earl F. Bennett, Soils Engineer, New York State Department of Public Works, was the speaker.

Many have looked for a simplification of soil mechanics, Mr. Bennett pointed out. But first, engineers must work in structural soil-mechanics theories and applications; only then can the structural reactions of soil be readily understood. For this reason he believes it paramount that every highway department have a trained soils engineer. It is also important that every highway engineer, as well, learn to use, inspect, and control soils.

The job of a soils engineer in a highway department is to cooperate with department members responsible for design; and to organize his own group to give service. This service has three phases, Mr. Bennett said.

First there is the work of the office soils engineer. He keeps in close contact with the various department engineers, and discusses with them their design and construction problems. He sets up the schedule of boring analyses and field work. He supervises soil tests. He submits the reports, with recommendations based on his knowledge plus his judgment. To make the field surveys really successful and helpful, he must know exactly what it is that the design and construction engineers want to know. He must know the questions they have in mind so he can base his procedures on them and on the conditions of the area.

Then, second, there is the service of the operations group in the field. This group makes borings, takes soil samples, and handles field inspection. Its forces may be supplemented by help from other branches of the department. Its work is extremely important and depends on proper equipment, proper methods, and proper training. Its deficiencies, if it has any, cannot be made up for in the office or the laboratory. Third, there is the service of soil testing. This work, Mr. Bennett said, should be under the supervision of a man trained in soil mechanics and testing. He must know structural soil mechanics. He must correlate this knowledge and apply it to the work of the highway engineer.

In the matter of field inspection, Mr. Bennett stressed how hard it is to write general specifications for compaction requirements. So many things affect compaction. Soil characteristics and moisture controls vary. The passage of heavy equipment over a fill has its effect, too. Specifications will lead to

trouble, he warned, unless they recognize the various soil groups and their characteristics under compaction.

He recommended that the minimum requirements be established for compaction; and that then the contractor be allowed to use whatever methods and equipment he chooses which will meet these requirements. This should insure the degree of compaction and stability of fill desired. And at the same time it should keep costs at a minimum.

Holcomb Heads P&H Sales

The promotion of Ralph D. Holcomb to the position of General Sales Manager has been announced by the Harnischfeger Corp. of Milwaukee. He will direct the sales of all P&H products: excavators, road machinery, hoists, cranes, and welding equipment.

Mr. Holcomb has been with the company for 18 consecutive years; his former position was that of District Manager for the San Francisco territory.

Low-Cost Way To Remove Scale From Diesel Engine Water Jackets

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to make Wet Walls and Cellars DRY

These actual photographs of completed jobs are but a few examples of the Aquella applications now being made in every part of the country—on every type of porous masonry structure. Never in the waterproofing industry has there been anything like this acceptance by architects, engineers, waterproofing contractors, builders and home-owners.

The explanation is simple. Aquella works—and the principle on which it works is entirely new. The inor-

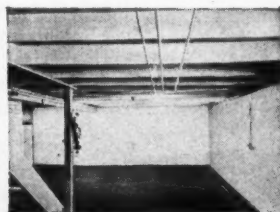
ganic ingredients are so *finely ground* that, when mixed with water and scrubbed into the masonry surface, they penetrate the minutest pores, then *expand* to form a seal that *continues to harden with age*. Even the presence of a hydrostatic head of 500 lbs. per sq. ft. on the *unprotected* side has no effect on the integrity of the Aquellized surface. Aquella leaves a brilliant white, beautiful finish, which may be painted over. Also comes in soft shades: buff, rose, green and gray.



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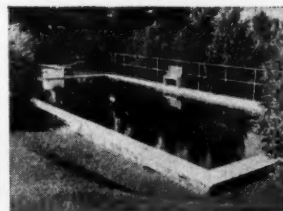
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Basement . . . Parsons, Kansas



Apartment House . . . Norfolk, Va.



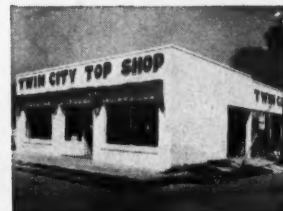
Pool on Estate . . . Uxbridge, Mass.



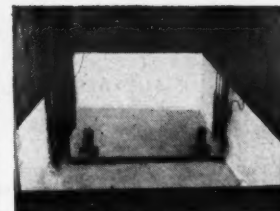
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Specify Aquella for effective control of water leakage, dampness or seepage on exteriors or interiors . . . above or below grade . . . on all porous masonry surfaces, such as concrete, brick, light weight masonry units, stucco or cement plaster.

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CITY STATE



C. & E. M. Photo
Here a 14-foot Moretrench wellpoint, 1½-inch inside diameter, is jetted into the ground alongside a 6-inch header pipe on the Union Building & Construction Co. subcontract.

Concrete Pipe Laid To Drain Underpass

(Continued from page 1)

as far as 14th Avenue. There it makes a right-angle turn and continues west for 325 feet, passing under the railroad until East 55th Street is reached. Here the new line makes another 90-degree turn and runs south on a line 20 feet east of the existing 42-inch line. At a point 57 feet from the outfall, both lines come together in a common headwall where they empty into the creek.

The new pipe is not laid as deep as the old line. In places, the top of it is flush with the surface of the ground, with the maximum cover only about 4 feet. Over its total length, the pipe drops about 10 feet, giving an average gradient of 0.5 per cent to the line. The original 42-inch pipe was laid with open joints and backfilled with pervious material. The joints in the new 48-inch storm sewer are sealed with a cement mortar; the backfill consists of material excavated from the trench.

Work began at the outlet end as a Northwest crane with a 40-foot boom and a Page 1-yard dragline bucket excavated the trench for the pipe. Because of a near-by pole line and the danger of becoming fouled in the over-

head wires, the crane boom was kept almost horizontal to the ground during the digging; it was raised only slightly after the swing was made to empty the bucket. Because of the cramped working quarters and to eliminate much shifting of the crane, only about 40 feet of trench was opened at a time. In this way the pipe was laid and the backfill made with the minimum movement of the crane. Trench excavation was piled up along the west side of the cut, since the railroad embankment was on the opposite side. The new pipe line is on the railroad right-of-way.

Wellpoint System

While setting the first few lengths of pipe, it became immediately apparent that this was to be no run-of-the-mill operation. Trenching with the dragline disclosed the excavation to be in a wet flowing-sand stratum. It was fed by numerous springs which quickly bogged the workers down so that they were unable to move in the treacherous quagmire. The men had to be lifted out of their boots from the trench and the boots recovered afterwards. The result was that it soon became very difficult to get labor for the job, and the rate of progress was pitifully slow. Accordingly the contractor decided to install a wellpoint system to dry out the ground before starting the excavation.

A Moretrench wellpoint system with a Jet-Well self-priming Hercules-powered pump and 300 feet of 6-inch header line was rented for the job. The pump was a combination 8 x 6 vacuum and a 6 x 5 centrifugal, while the header pipe came in various lengths and bends to suit the layout of the project. Plugs were laid out in the header at 2½-foot intervals, but it was necessary to tap only every other one with the 14-foot x 1½-inch risers. The header was first laid on the ground beside the place where the 12-foot-wide trench was to be dug, and wellpoints were jetted into place on 5-foot centers.

At the beginning, water for the jetting was pumped from the creek. But once the system got in operation, water was pumped from the ground through wellpoints already in place and working. The discharge end of the pump was closed and the water diverted through a 2-inch hose which led to the top of the wellpoint being jetted. Here a connection was made through a 15-foot x 2 and 1½-inch riser pipe which screwed into the top of the wellpoint.

The wellpoint was inserted into the ground about 2 feet off the header line. In a few minutes it was jetted into the ground for its full 14-foot length and hooked up to the header by a simple swivel connection. Such was the case in sand. But where impervious soil was met, a Moretrench jetting chain was wrapped around the lower end of the wellpoint and tied by a rope which was passed over and fastened to the swivel connection at the top. This jetting chain made a reaming hole in the ground around the pipe; after the wellpoint had reached its proper level, the chain was pulled out and coarse sand was dumped around the wellpoint and riser pipe to act as a filter. As the soil was mostly sand, the jetting chain was needed in only a few instances. The hidden springs supplied ample water for the jetting, as the pump forced a steady stream down through the center of the riser and out of the wellpoint tip.

When the pump was dewatering the ground preparatory to excavating the trench, the vacuum averaged 18 to 20

inches, and the discharge was a steady 3 to 4-inch stream from 300 feet of 6-inch header pipe. This emptied into the existing 42-inch sewer through near-by manholes. With the use of this wellpoint system the ground was changed from a wet, free-flowing sand to absolutely dry material where the men were able to work in shoes instead of high rubber boots.

Production was stepped up from a previous high of 16 feet of pipe laid in a day to 14 lengths or 56 feet of pipe. The wellpoints were employed for 700 feet of trench back from the outlet creek, and the header pipe was advanced to take care of the excavation. Because the excavation and pipe laying were confined to short sections of trench, only from 30 to 35 jets were in operation at a time. Further back where the wellpoints were not required, ground water was removed from the trench by a Domestic 3-inch pump when necessary.

By using wellpoints in this area surplus (Continued on next page)



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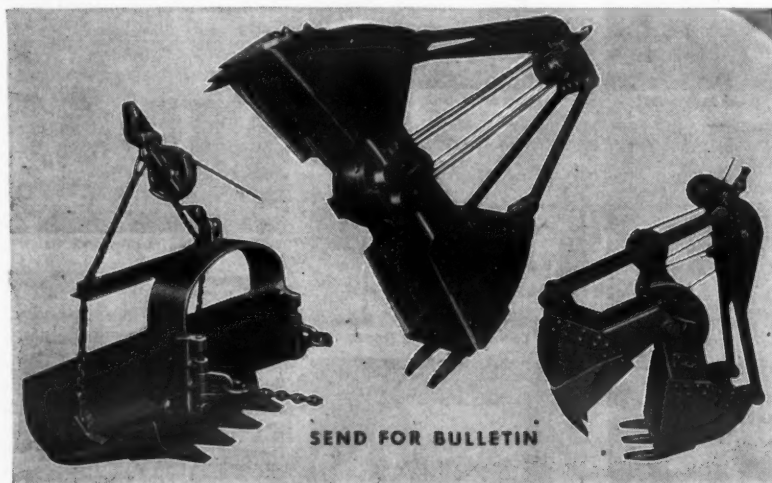
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Concrete Pipe Laid To Drain Underpass

(Continued from preceding page)

ounded by springs, the contractor dug the trenches and laid the concrete pipe in the dry without the use of sheeting or shoring. A 6-man crew installed the wellpoint system and shifted it about when necessary.

The Concrete Pipe

The 4-foot lengths of pipe, each weighing 3,500 pounds, were purchased from the American Concrete Pipe Co. of Union, N. J. They were delivered to the job by truck after a 20-mile haul. The crane lowered the sections into the trench by means of a pipe hook having a 3-foot throat. At each end the pipe rested on two 2 x 8's. These were set on top of each other and extended the width of the trench to insure that the exact grade was held.

Jacking the Pipe

A total length of 44 feet of extra-strength pipe was jacked beneath the railroad tracks on a grade 14 feet below the rails. Because of the heavy traffic on this Erie line, with high-speed 100-car freight trains passing constantly, the open-cut method of laying pipe could not be used. Neither could tunneling be attempted because of the possibility of the tracks settling. Jacking was done not through the embankment but through the soil beneath the fill. This earth is a medium-fine sand which was well suited for the jacking method, and furthermore was always somewhat damp.

All jacking was done from west to east. The first step in the operation consisted of digging a trench 9 feet wide x 15 feet long. This was sheeted and shored for a length of 18 feet where each new length of pipe was added for jacking. The sheeting was of 2 x 10-inch stock with a maximum length of 11 feet 6 inches; it was backed with 4 x 8 wales at the bottom on each side and also at the top of the trench. Every 6 feet the trench was cross-braced with 8 x 8's set just above the level of the top of the pipe.

At the edge of the railroad embankment an A-frame consisting of three 8 x 8's was set up to support a Yale 3-ton hoist hung directly over the trench. Each section of pipe was rolled out to the hoist on planks supported on the cross bracing, and was then lowered into position in the trench. Because of the overhanging wires, the trench excavation, sheeting, and framework installation were all done by hand.

At the west end of the trench, a jacking frame was constructed. It was made of 8 x 8's shaped like a right triangle; one end bore against two jacks and the opposite end fitted against a length of pipe. The jacking-frame timbers were bolted together and the whole unit slid along on two 8 x 24-inch wooden runners or sleepers laid along the bottom of the trench on 4-foot centers. A 2 x 4 guard was nailed along the top outside edge of each runner to keep the carriage in line. The spigot end of the pipe fitted into the pusher end of the frame which was built with a circular collar cut from 4 x 12's. The bell end of the pipe made contact with the sandy soil during the jacking, and no steel cutting edge was required for the operation.

The jacking was done with two Richard Dudgeon 100-ton jacks. They were located at the end of each runner, and were operated and controlled by two hydraulic pumps placed outside the trench at ground level. The jacks have 6-inch shafts which exerted pressure against a 1-inch steel plate, 12 inches square; this transmitted the force to 8 x 8 x 8-inch timbers. Actually the jacks have a 12-inch stroke, but only 8 inches

was used at a time. After the pipe was advanced 8 inches, the jacks were retracted by hooking up the chain from the hoist to a deadman at the rear of the trench, and connecting the other end to the carriage. Another 8 x 8 x 8-inch timber was then placed in the opening and jacking was resumed.

For the first couple of feet of penetration, which was mostly through a cinder fill, the full force of the jacks was exerted against the circular collar which distributed the pressure around the entire periphery of the pipe. Once the moist sand was reached, men with shovels, working within the 48-inch pipe, excavated for about an inch in front of the pipe as it advanced. The sand was removed by hand from within the pipe, shoveled onto a platform, and then shoveled from the trench.

The pipe was installed on a 0.45 per cent grade and the joints were sealed from the inside with cement. With a crew of five men employed on the jacking, the work progressed at the rate of one section of 4-foot pipe in an 8-hour



C. & E. M. Photo

Trench excavation on the Ell-Dorer grade-separation project disclosed a wet flowing-sand stratum which called for the installation of a Moretrench wellpoint system with a Jet-Well pump to dry out the ground.

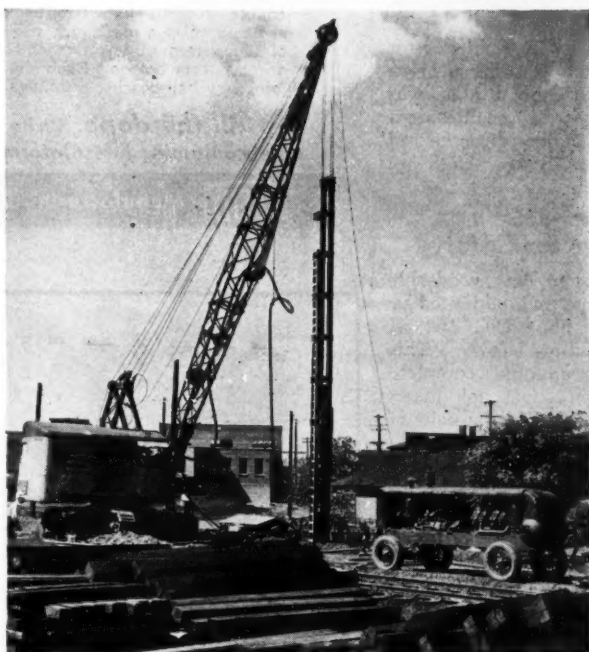
day. At the end of each day's work a timber bulkhead was installed at the end of the advanced section of pipe. The entire 44 feet of pipe was jacked from the one set-up. No increase in pressure was necessary along the way,

as the only force to overcome was that of friction from the dead load of the pipe. By excavating in advance of the pipe, the need of exerting the full power of the jacks was eliminated. Oil was (Concluded on next page)

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C. & E. M. Photo

Some 44 feet of sewer pipe had to be jacked under the Erie tracks. Here a 4-foot length of pipe is rolled out to a Yale 3-ton hoist, supported by an A-frame, which will lower it into the trench by jacking.

Concrete Pipe Laid To Drain Underpass

(Continued from preceding page)

used in the hydraulic pumps.

Temporary Bridge

While the storm sewer was being installed, a temporary bridge was being constructed immediately to the east of the existing structure. It was to carry the railroad over the highway so that the original span could be dismantled and the new bridge erected in its place. The temporary crossing was built on timber bents having piles from 35 to 50 feet long with 8-inch tips and 16-inch butts.

A subcontract for driving 180 timber piles, both for the detour bridge and the permanent structure, was awarded to Linde-Griffith Co. of Newark, N. J. This firm used a Bucyrus-Erie 42 steam rig for driving the piles. The driver had a 60-foot boom and 60-foot steel leads for driving the fifteen bents for the detour span, and for the piles to go beneath the 100-foot-long concrete abutments in the new structure. Trains were permitted a speed of 40 mph over the temporary trestle.

The new bridge will be completed by August, 1947. Its two 50-foot spans will be supported on two concrete abutments and a concrete center pier. The superstructure will consist of two 84-inch through-type steel girders to support a load of 16,000 pounds per linear foot of track. The bridge is designed

for E-70 loading.

Quantities and Personnel

The major items in the bridge construction include:

Structural steel	540,000 lbs.
Excavation	5,550 cu. yds.
Concrete	1,215 cu. yds.
Reinforcing steel	23,000 lbs.
Timber piles	9,100 lin. ft.
Steel for temporary trestle	61,000 lbs.

In the roadway phase of the work the following items were of major importance:

Excavation	2,653 cu. yds.
Reinforced-concrete pavement, 10-inch	3,817 sq. yds.
Reinforced-concrete culvert pipe, 48-inch	2,038 lin. ft.
Manholes	13
Inlets	10

For the Union Building & Construction Co., which handled the roadway part of the contract, J. A. Johnson was Field Engineer and General Superintendent and Russell Wise was Office Engineer. On the bridge work, Henry T. Ell, a member of the firm of Ell-Dorer Contracting Co., supervised the operations of his construction crew. H. A. Passman is Resident Engineer for the Erie Railroad.

For the New Jersey State Highway Department, James H. Driscoll is Resident Engineer assisted by Stuart C. Mitchell. The Department is headed by Spencer Miller, Jr., State Highway Commissioner, with Charles M. Noble, State Highway Engineer, and C. F. Bedwell, Construction Engineer. R. M. Beck is Northern District Engineer for the area which includes this project. The construction of the bridge was supervised by Albert E. Lee, Resident Bridge Engineer, under direction of Morris Goodkind, State Highway Bridge Engineer.

Wood Shoes for Safety

The line of Davenport wood-sole shoes is described in a manual issued by the F. J. Stahmer Shoe Co., 2349-51 Boies Ave., Davenport, Iowa. This pocket-size manual contains a complete listing of wood-sole shoes for many purposes, a helpful index, and a page of instructions on the care of feet.

Some of the features claimed for these shoes are long wear, comfort, sure footing on damp slippery floors, and protection against rough surfaces. They are said to be proof against water, dust, and acid.

The Davenport shoes are made with built-on uppers. There are also paver's sandals for wear with ordinary shoes, and all-purpose boots and hightops.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 48.

Line of Saws Described

Sixty pages of saw information are contained in Catalog No. 43 of the Ohlen-Bishop Mfg. Co., 910 Ingleside Ave., Columbus, Ohio. The company makes a complete line of all types of metal and wood saws.

Styles, sizes, shipping instructions and pictures are included for each model of the various types: carpenter saws, pruning saws and knives, cross-cut saws for tree work, and mill saws. Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 51.

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Vital Ship Channel Deepened by Dredge

(Continued from page 2)

the main condenser. This big pump, with 14-inch suction and 12-inch discharge, sees continuous service.

The 27-inch centrifugal dredging pump was designed to meet Standard Dredging Corp. specifications, and built at Caldwell Foundry, Birmingham, Ala. For dredging mud, a 74-inch-diameter runner with four vanes is being used. The pump has a 24-inch square inspection manhole on top of the intake just ahead of the casing. Superior and Cyclone chain hoists can easily pull anything out of the pump which may stick. Rocks or logs bigger than 18 inches will hang.

Shortly before the Burlington started the present Army job, she dredged some slips for private interests. The report had been circulated that a 5-inch shell had been dropped overboard from a destroyer during the war. Several oxygen drums were picked up and passed through the pump and discharge line, which seemed to bear out the truth of the rumor.

Suddenly one day, as Dredge Captain E. Y. Eliason was on the pipe line, a tremendous explosion seemed to lift the whole pipe line off the bay.

"I ran back to the dredge as fast as possible, thinking we had picked up this shell," Captain Eliason explained. "Instead, we had picked up an oxygen bottle. When we opened up the pump, the bottle didn't have a dent in it, except at the cap. Somehow it stuck in the discharge throat of the pump, and a runner vane knocked off the cap as you would uncork a beer bottle."

There was no damage, except that the crew members who happened to be near the pump almost died of fright.

Dredging Methods

The 1,125-foot-wide Galveston Channel has been divided into four cuts, all of equal width. For purposes of accurate payment, the U. S. Engineer Office has designated four "acceptance areas". As soon as one of these areas has been cleaned up, government surveyors run sections every 200 feet, with soundings on 10-foot centers. Payments are made when an acceptance area has been cleaned to the acceptable depth of 34 feet.

Standard Dredging Corp. sets its own buoys at the sides of the cuts, and has the privilege of having a representative in the Government survey boat when after-dredging soundings are made.

Work started on the north cut near Pelican Island, on the heaviest yardage. The Burlington is taking the bank down clean as she progresses, in order to leave everything finished as she goes. Moving back to pick up a shoal is costly, and these backtracks are kept to an absolute minimum. Sometimes the soft material will cave in behind the cutter if the bank is high, and unless an operator is on his toes such shoaling may occur.

The north cut is carried through to an acceptance point, and other cuts follow in order with one exception. Captain Eliason has been taking advantage of slack maritime traffic at the end of the week, generally, to move in and pick up the shallow digging on the cut at the Galveston side of the project. The more he can operate in this manner, the less his men will have to break their pipe line to allow ships to pass.

All four cuts can be made on 6,000-pound swing anchors, moved ahead by a tug and anchor scow. No shore anchors of any kind have been necessary.

The heavy mud is handling very well. Although it is heavy, a 5-foot bank can be removed with one pass of the 6-foot 7-inch-diameter cutter. Optimum pipe-

line load is about 23 per cent solids at a velocity of 18 fps. The operators have found that the material digs best when they dig a heavy cut on a slow swing.

Gages in the control house record main steam pressure, suction vacuum, ring pressure on the turbines, and discharge-pipe-line pressure. There is a depth gage painted on the Burlington's A-frame, with a weighted pointer to tell how deep the cutter is operating.

The average digging vacuum is about 12 inches, and the average pipe-line pressure of 65 psi will move the material very nicely towards the dump ground.

One of the most favorable digging conditions of all is the non-abrasive character of this material. An operator can plug a pipe line, if he gets over-anxious. But he can't wear one out or cause a pump to be re-lined until he's pumped at least 10 or 11 months at a rate of 1,000,000 yards a month. The blue mud simply slides along with scarcely any surface friction. You can

(Continued on next page)

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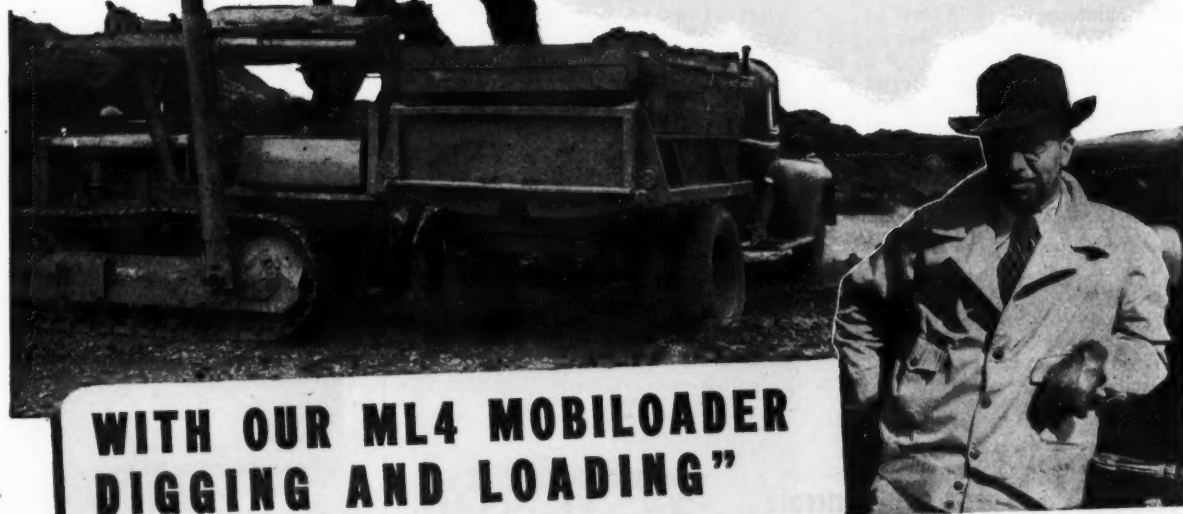
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Vital Ship Channel Deepened by Dredge

(Continued from preceding page)

walk the pipe line while the dredge is digging at peak performance, and rarely will you ever hear a rock bouncing along.

Steady digging requires a steady supply of fuel oil and fresh water, and this is brought in by scow. The dredge has a storage capacity of 10,000 gallons of fresh water, and 340 barrels of fuel can be stored in her bunkers. One of the safety rules followed very closely concerns the fuel scow. After fuel has been taken aboard, the fuel scow is promptly towed to a dock and tied away from the dredge.

Disposal of Material

In the old days, Pelican Island was only a small sand spit. Through the years a dike was built along the present north boundary of the Galveston Channel, and dredged spoil has built the island up to about 1,000 acres. The material now being dredged is dumped on Pelican Island all along its length. Near the upper end of the contract a small amount of yardage will be put ashore on the Galveston side in a military reservation.

When Standard Dredging Corp. dug the slips along the Galveston Channel, it had to lay several pipe lines. These were left in place and are now being used to carry the mud from the Army contract. Other shore-pipe connections have been laid at 2,000-foot intervals up the edge of Pelican Island. Captain Eliason is trying at all times to keep the total length of pipe line under 3,500 feet, with a maximum lift of 18 feet.

Some 3,500 linear feet of 27-inch steel pipe line is available, most of it in 50-foot lengths, to carry the material over the water. The 50-foot floating sections are supported by a 56-inch x 24-foot cylindrical steel pontoon at each end, braced on each side by 12 x 12-inch fir strongbacks. The free swivel double-elbow discharge connection at the back of the dredge permits the Burlington to use a rigid, tightly anchored pipe line. Special dredge joints built by Mobile Pulley & Iron Works are used on the floating sections, with tough rubber gaskets in the connections.

A special shore connection with a

cable hoist is used to raise the floating line up to a level where land pipe can take off. Land-pipe sections are also 27-inch diameter, with 3/8-inch steel walls, in sections 15 1/2 feet long. There are 470 of these sections now available on the job, and the land lines are being laid in straight lines without the usual wyes and valves.

A crew of 12 men per shift handles all shore pipe. The mud fill is usually so sloppy and soft that equipment is out of the question, and all pipe sections are rolled by hand. The material falls away on the gradual slope of about 55 to 1, and often the dredge pumps for many hours before pipe must be added. All shore pipe is put together by slip joints, and is cable-braced near the junction with the floating pipe.

Auxiliary Craft

In order to keep the Burlington working at top speed, a number of auxiliary units have been assigned to the Galveston job. There are two anchor scows, a water barge, and a fuel scow. The tug Peter C is used for all heavy towing. It has a 55 x 16-foot hull, and is powered by a 180-hp Union diesel engine. The Martha is 49 x 14 feet, with a Union 75-hp engine. The Betty T is about the same size as the Martha, with a 120-hp Caterpillar diesel for power. The smaller tugs are used for anchor-scow work and miscellaneous towing.

Besides this auxiliary craft, a section of Standard's dredge yard in New Orleans is equipped to roll sheet steel for pipe lines and pontoons. All the pipe lines and pontoons now being supplied to the Galveston job are fabricated at New Orleans.

Safety Plays a Part

No Army Engineer job is quite complete, of course, without its safety inspector. This one may be a little unusual, however, because it has one of the safest safety men who ever donned a kapok vest on dry land. Ben P. Sterrett of the Galveston District Office of the Army Engineers is charged with the enforcement of safety provisions.

"Really, I believe you should differentiate between the usual safety inspector's job and this position," he said. "Since my position here is advisory, it should be referred to as 'accident prevention analyst'."

"Once each month I make an actual physical inspection of the contract, and it is up to the contractor to correct such

unsafe conditions as I deem necessary."

Sterrett pointed out that a safety skiff was standing by on one of the stern pipe-line pontoons. Deckhands on the pipe line were wearing kapok vests, and deckhands on the tugs were fixed up the same way. A 3/8-inch cable guard was stretched about 3 feet high all around the outside perimeter of the

dredge deck.

"Ring buoys on the pipe lines can be thrown to a man overboard, and we even have some of these flashing night lights"; here he referred to the small battery-operated location markers developed during the war. The pipe-line walkway over water was made with two

(Concluded on next page, Col. 3)

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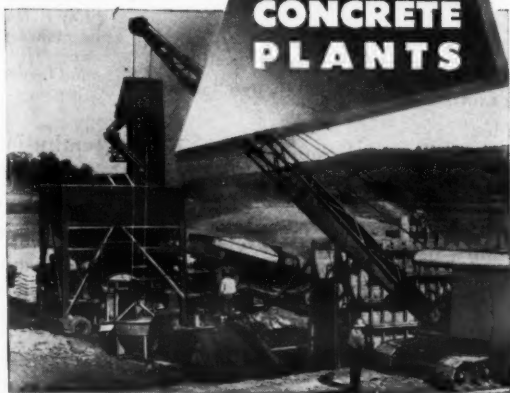
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1 - CONTRACT 8 - JOBS 11,000 Cu. Yards of Concrete 115 Moves

A 3/4 yd. Strayer Portable Concrete Plant averaged 24 cu. yards an hour under severe conditions, pouring 150 batches in one 5 hour period and paid for itself several times over. That was before the war — today's Strayer plant is easier and faster in operation thanks to fingertip hydraulic controls on all gates and many other design refinements.



Write today for complete data on the Strayer Portable Concrete Plant that combines vertical conveyor to 3 compartment 20 cu. yd. Bin Storage — Weighing AggreMeter — Cement Pre-mixing — Accurate Water Control — Engine Drive. All mounted on 8-Wheeled chassis permitting moving from job to job.

STRAYER Portable CONCRETE PLANTS

Eric Steel Construction Co., 275 Gelst Rd., Erie, Pa.

BUCKETS • AGGREGATE METERS • PORTABLE CONCRETE PLANTS



Help Keep YOUR Machines Working Every Hour of Every Day

MECHANICS

Roller Bearing
Universal Joints

UNIVERSAL JOINTS you will add considerably to their value to users and help protect your machine's reputations for reliable, economical operation.

Let our engineers show you how this and other MECHANICS Roller Bearing UNIVERSAL JOINTS advantages will contribute to the QUALITY of your machines.

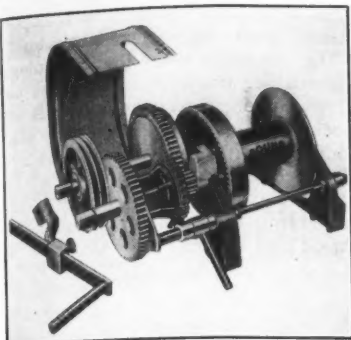
— lifetime or once-a-season lubrication feature saves up to ten percent of the operator's time — formerly spent greasing plain bearing universal joints — cuts down grease costs and avoids expensive breakdowns that are caused by insufficient lubrication.

By equipping your machines with MECHANICS Roller Bearing



MECHANICS UNIVERSAL JOINT DIVISION

Borg-Warner • 2026 Harrison Ave., Rockford, Ill.



This 5-ton-capacity power winch is known as the Round No. 102. It features an automatic friction disk-type brake for safe controlled lowering and suspension of the load.

New Power Winch

Production of a 5-ton-capacity power winch to be known as the Round No. 102 has been announced by David Round & Son, 545 Henry St., Cleveland, Ohio. It is intended for general construction and industrial use.

Power is provided by a 2-hp reversible-type electric motor through a V-belt pulley. The unit has an automatic friction disk-type brake. The pawl may be lifted from the ratchet by means of a counter-weighted lever which releases the brake and permits the cable to be run out as rapidly as desired, according to the manufacturer. A crank is supplied with the winch for use in case of power failure. Rope capacity of the regular drum is 165 feet of 5/8-inch wire rope and 285 feet of 1/2-inch wire rope.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 34.

Dozer-Shovel Combination

Catalogs describing its Bull Clam shovel are available from the Drott Mfg. Corp., 4344 No. Green Bay Ave., Milwaukee 12, Wis. This unit consists of a bulldozer blade with a clamshell type of jaw and bowl attachment. It is controlled by the Drott positive closed hydraulic system and is designed for mounting on all current models of track-type tractors, the manufacturer says.

The Bull Clam shovels for dirt moving are built in three sizes: 1, 2 and 3-yard capacities. Lifting capacities are from 3,000 to 9,000 pounds, depending on tractor sizes.

The catalogs describe and picture the operation of the unit in carrying, leveling, scraping, loading, etc. Ample illustrated, they show in diagrams the control panel, depth gage, and construction of the hydraulic system.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 55.

New Wall-Chart Guide For Earth-Mover Care

Another in the series of wall maintenance charts prepared by R. G. Le-Tourneau, Inc., Peoria, Ill., is now available. This latest chart, 17 x 22 inches in size, deals with the servicing and lubricating of the Super C Tournapull.

It shows at what intervals the Super C should be serviced and lists the points to be checked or adjusted at each servicing. In addition, it illustrates lubrication points by labeled photographs, and carries recommendations as to what kind of lubricants to use and how often.

Copies of Form No. TP-128 may be obtained from the company. Or use the enclosed Request Card. Circle No. 85.

Photocopy Machine

A broadside describing the Apeco Photo-Exact is now available from the American Photocopy Equipment Co., 2849 No. Clark St., Chicago 14, Ill. The Apeco is a machine said to make accurate photocopies of anything written, printed, typed, drawn, or photographed.

The folder lists features claimed for the Photo-Exact: accuracy of detail, speed of operation, economy, and permanent photocopies which will not fade, deteriorate, or crack. It describes the machine's method of operation, suggests uses, and describes other literature which the company issues.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 46.

Death Takes Bill Berry

The death of E. L. Berry of a heart attack has been announced by the Link-Belt Co. of Chicago. Mr. Berry was Vice President in charge of production at the time of his death. He had been with the company since 1914 and its Vice President since 1944. He was also a vice president and director of Link-Belt Speeder Corp.

Vital Ship Channel Deepened by Dredge

(Continued from preceding page)

2 x 12-inch planks, bolted to steel saddles and having 2 x 4-inch guard rails.

"Captain Eliason is very cooperative," Sterrett concluded, "and does whatever I point out as necessary. I often believe he is as interested in low frequency and severity scores as I am."

Captain Eliason, who is the soul of simple Scandinavian friendliness, did seem interested in the welfare of his crew, come to think of it. And incidentally, he happened into the dredging business by accident. Born in Sweden, he found himself marooned in the United States 25 years ago, out of work due to a maritime dispute.

"I had to find work, so I landed a job on board a dredge. And I've been at it ever since," he smiled. If he keeps at it at the rate of speed he made through December and January, Galveston Channel will again be cleaned up

to a safe navigation depth by July.

The constant deposit of mud is occurring steadily, and the Army Engineers estimate that about 1,000,000 cubic yards, or 18 per cent of the contract amount, will be deposited on Standard's contract during the time it is dredged.

Personnel

The contract is being directed by Colonel D. W. Griffiths, USA, District Engineer at Galveston, with W. W. Vance, Director of the Operations Division. Formerly a Lieutenant Colonel in the same position he now holds as a civilian, Vance has directed most of the marine construction in the district for several years. E. H. Vaughan, Jr., is the Resident Engineer.

W. A. Waters is District Superintendent for Standard Dredging Corp., with offices in Galveston. S. L. Harrison is the Burlington's Chief Engineer, and E. Y. Eliason is her Captain.

Accidents are man-made! Avoid the hazards that cause them.



CLEARING — a one-man crew on land clearing. Cuts brush and trees at ground level. Lowther C-Saws will average an acre or more of clearing per day of dense brush and small trees.



FELLING TREES — 30" oak felled in 2 minutes, 52 seconds with Lowther C-Saw. 11" pine felled in 15 seconds. The fastest, most economical tree felling method.

• **WORK ANY AREA**
Easy to use in cramped quarters where large equipment can't operate—affords better control where selective clearing is required.

• **PROVED ON MANY JOBS**
Thousands used by logging companies, mines, utilities, contractors, parks, etc.—for clearing brush, trees, cutting construction timber, sawing, piling, etc.

You can see a C-Saw at work near you.



• **SMALL INVESTMENT**
Priced under \$400.00—will quickly pay for itself on the first few jobs and release heavy equipment for other work.

• **LOW COST-PER-HOUR**
Carefully kept records of one of the largest utility companies show savings of 50% in clearing operations with a fleet of Lowther C-Saws. Their cost of operation including large depreciation, averaged only 25c per hour. Write for this story!

• **ONE-MAN OPERATION**
A completely portable saw with its own power plant. One man can easily handle. Equipped with self-propelling "Rototrac" drive for travel over rough, hilly terrain.



BUCKING LOGS—ideal for sawing up construction timber, piling, etc. C-Saws have cut 10-20 cords of wood per day on only 3 gallons of gasoline.

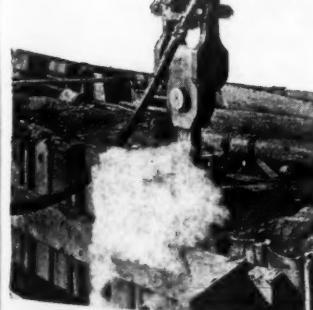
HARRY A. LOWTHER CO. CEM547
141 West Jackson Boulevard
Chicago 4, Illinois

Send complete information on the Lowther C-Saw, including prices and specifications.

Name _____
Title _____
Company _____
Address _____
City _____ State _____



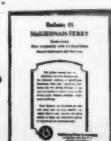
DOUBLE-ACTING PILE EXTRACTORS with unusual pulling power



These rugged extractors connect with piles quickly, loosen them speedily, remove them efficiently, place them just where desired—then disconnect easily. Mechanical principles similar to those embodied in McKiernan-Terry Double-Acting Pile Hammers make the operation of McKiernan-Terry Pile Extractors extremely effective and economical for any pile-extracting job. Two standard models—heavy-duty and extra heavy-duty.

MEK-1007

SEND FOR BULLETIN NO. 55 for full information, specifications, etc. on McKiernan-Terry Double-Acting Pile Hammers and Extractors.



McKIERNAN-TERRY CORP.
Manufacturing Engineers
19 PARK ROW, NEW YORK 7, N. Y.



For D4's equipped with hydraulic dozers, the new LaPlant-Choate hydraulic conversion assembly consists of two valves which mount on the rear of the tractor. One valve is for operating the scraper bowl, the other for operating the ejector and scraper apron.

Hydraulic Unit Adds To Uses for Tractor

Owners of Caterpillar D2 and D4 tractors equipped with hydraulic dozers will be interested in a new hydraulic conversion unit developed by LaPlant-Choate Mfg. Co., Inc., 2830 First Ave., Cedar Rapids, Iowa. These units are designed for hooking into existing hydraulic systems. And they are said to make it possible to operate scrapers from the dozer hydraulic system without the need for two separate systems. This saves the cost of an extra pump and oil reservoir and increases the job range for tractor equipment, the manufacturer points out.

The conversion units are available in two designs: one for adapting the 2-yard LaPlant-Choate scraper to present D2's with hydraulic dozers; and the other for adapting the 4-yard scraper to the D4. The same assemblies, it is said, can also be used on other makes of hydraulic tractor-dozers equipped with front-mounted pumps and four-position valves, as long as capacity of the pump and horsepower of the tractor are adequate for scraper performance.

For D4 tractors, the conversion assembly consists of two valves which mount on the rear of the tractor with manifold and necessary hose for connections to the hydraulic circuit. One valve operates the scraper bowl and the

other operates the ejector and apron of the scraper. Both dozer and scraper can be operated independently of each other without the use of shut-off valves.

The conversion unit for the D2 consists of special combination piping fitted into the hydraulic system. It is operated by the same valve which operates the dozer.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 20.

Liquid Weed Killer

It is now successfully producing its 2, 4-D Knox-Out weed killer in liquid form, announces Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa. Contractors and highway men concerned with roadside development may be interested in this announcement. For advantages claimed for the liquid form include economy, effectiveness of action, and simplicity of use.

It is said to be capable of killing most broad-leaved lawn and garden weeds while not harming most types of lawn or field grasses. When applied as a spray in water, it is absorbed by broad-leaved weeds and taken into their root systems. It kills the plants in from one week to a month, according to company reports.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 27.

Concrete-Form Design And Construction Data

Sixty-six pages of information about its line of concrete forms, ties, clamps, and other related equipment make up the catalog of the Williams Form Engineering Corp., Box 925, Madison Square Station, Grand Rapids 7, Mich. It is now available for distribution to interested parties. The company makes concrete-form securing devices for all types of concrete forms including those for bridges, dams, retaining walls, roads, beams, etc.

Complete specifications are given as well as sizes and prices for both purchase and rental. Tables listing the most economical designing of forms as prescribed by the Williams company's engineers are an added feature. The book is illustrated with pictures of the clamps, their set-up, construction, and also their use on many major concrete jobs in the United States.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 65.

Shop-Tool Safety Guard Of Transparent Plastic

The use of Plexiglas for safety guards on shop tools is described in a catalog issued by Rohm & Haas Co., 222 W. Washington Square, Philadelphia, Pa. The plastic can be drilled, sawed, or tooled. Therefore, it is claimed, guards for saws, grinding wheels, lathes, and similar machines can be made from it

right in the user's shop, as well as purchased from commercial fabricators.

The catalog lists the advantages claimed for this type of material, and shows some typical installations. It lists stock sizes of Plexiglas, and the office addresses of technical representatives of the company.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 54.

It's DECALS

FOR SMART IDENTIFICATION

CONTINENTAL DECALCOMANIA CO.
GRAND RAPIDS, MICHIGAN

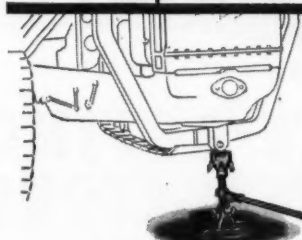
JOBS LIKE THESE are "Naturals" for Simplex UTIL-A-TOOL



It Pulls Wheels



It Clamps and Holds



It Lifts and Lowers

The most striking feature of the Simplex Util-A-Tool probably is its versatility. It handles all sorts of troublesome production, installation, maintenance and repair jobs with such cost-cutting speed and efficiency that time and labor savings on a single job often return more than its full cost.

Packed in a sturdy metal box not much larger than a mechanic's tool kit, a Util-A-Tool is readily carried anywhere in the plant or in the field. Men who have given the Util-A-Tool a real workout call it "The Tool of a Thousand Uses". It pulls. It pushes. It spreads. It bends. It clamps. It holds. It lifts. The fastest universal wheel puller yet devised—it's equally efficient in pulling gears, pinions and bushings.

Order a Simplex Util-A-Tool today. Check the time and money it saves you in 30 days and let the results decide whether you can afford to be without a duplicate kit in every busy department of your plant or field operation.

ALL THIS IN ONE HANDY KIT

- Three 1/2" x 40" chains with grab hooks and claws
- One lever bar
- One Spreader Jack
- One 3-way base and wheel puller
- Two sky hooks
- One push-pull screw jack
- One metal tool box (not shown)

Simplex
LEVER - SCREW - HYDRAULIC
Jacks

TEMPLETON, KENLY & CO.
1006 South Central Avenue, Chicago 44, Illinois

You Save MUSCLE POWER with STERLINGS

It's so easy to wheel heavy loads in Sterling Wheelbarrows, only a minimum of muscle power is required. Sterling's perfectly balanced construction permits 80% of the load to be carried on the wheel . . . only 20% by the operator. This saving in muscle power increases efficiency . . . allows more loads to be hauled daily . . . reduces hauling costs.

Although materials are still scarce, Sterling will make every effort to meet your wheelbarrow requirements just as soon as conditions permit.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Sterling
WHEELBARROWS



Look for this Mark of
STERLING Quality



New Concrete Paving For Beeline Highway

(Continued from page 1)

This native earth was a combination of silt and sand, with some clay. It had a bulking characteristic of about 1.4 between compacted and loose volumes. It was used for subgrade throughout the job, and lies directly underneath the new slab without the addition of an insulating blanket.

Design features of the new section include dowel and mastic contraction joints on 40-foot centers, and one-inch expansion-joint material of non-extruding fiber with 28-inch steel dowel bars on 120-foot centers. The crack patterns on this type of construction will be studied and correlated with data from other Nebraska highways built during the same year, and will probably influence future design.

Earlier in 1946 Dobson & Robinson had paved some runway additions to the Fremont, Nebr., Municipal Airport. When the company's low bid landed the highway job, its machines were available only about 5 miles from the starting point. Its Blaw-Knox aggregate and bulk-cement batch plants were moved to the town of Valley, Nebr., and set up adjacent to the Union Pacific railroad spur.

The Batch Plant

The Blaw-Knox aggregate plant had two 20-ton bins for the two aggregate sizes Nebraska specified. Coarse aggregate was shipped in from the George Kerford Quarry Co. of Atchison, Kans., and handled by a Link-Belt clamshell with a 40-foot boom. At various times, the 1½-yard Williams clamshell bucket on this machine was called upon to unload up to eight carloads of ¾-inch aggregate in 10 hours.

Sand was obtained from the Platte River only ½ mile from the plant. Since it had to be trucked in, a dumping sump 10 x 12 feet x 15 feet deep was built flush with the ground and braced with lumber spiling. Trucks dumped their loads to this sump, and the sand was transferred up to the Blaw-Knox hoppers by the Link-Belt clam.

Ash Grove and Ideal bulk cement was ordered. Both of these brands of portland cement are Nebraska products. They were shipped in hopper-bottom cars and unloaded by a screw conveyor at the Blaw-Knox 400-barrel batch plant. Both the cement plant and the aggregate batching plant were set up so the trucks could drive through.

The order of placing ingredients was designed to prevent cement from sticking to the batch-truck bodies. Sand and rock were put in first. Then at the cement plant, the truck driver and a laborer scooped out a small cavity in the top of the two batches, and the bulk cement was dumped. Sand and rock were then shoveled over the cement to prevent its blowing out on the longest or 9-mile trip.

On a 3-mile haul when the job was visited, 13 batch trucks were being used, each machine carrying two 1,385-yard batches per trip. These trucks were mostly Chevrolets, Fords, and Dodges. Five were contractor-owned and the rest were rented at an hourly rate of \$1.80, plus \$0.80 per hour for the driver.

For each 94 pounds of cement in each batch, the mix contained approximately 5.6 gallons of water. A state inspector stationed at the plant checked once every two hours to see how much moisture was already present in the sand and rock. The difference was then added at the mixer, turning out concrete with a slump of 2 inches on a 12-inch cone—a quite workable mix. The concrete batch weights listed are Nebraska Mix No. 46-B:

Material	Dry Weight	Wet Batch Weight	Per Cent Moisture
Sand	2,991	3,087	3.1
Rock	1,282	1,303	1.6
Cement	781	781	0

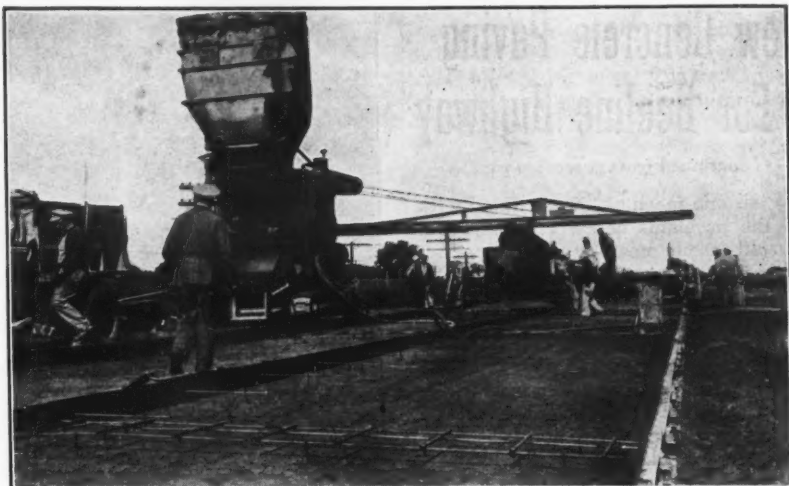
Sieve analyses with regard to size tolerances on Mix 46-B were also checked several times each day by the plant inspector. He was authorized to pass material which met these tolerances:

Sieve Size	Per Cent Retained (Rock)	Per Cent Retained (Sand)
¾-inch	0-20	.....
¾-inch	50-80	.....
No. 4	95-100	5-20
No. 10	.....	20-40
No. 20	.....	50-70
No. 30	.....	60-80
No. 100	.....	95-100

The concrete was checked for flexural strength at 7, 10, 14, and 28 days with a beam breaker. The 7-day concrete averaged 625 pounds; 10-day concrete 645; 14-day concrete ran 680 pounds; and most of the 28-day samples built up to 700 pounds.

Development of Water Supply

The development of a water supply



C. & E. M. Photo

This single-drum MultiFoote 34-E paver, with dual-gate bucket on a 30-foot boom, is about to dump a batch of concrete on the new U. S. 275 subgrade. In the background are spreading and finishing machines.

for concrete mixing came about partly through a fluke meeting. Superintendent

ent Ira Hill was walking down through (Continued on next page)

ON THE JOB.



All Over the World

No location is too remote or job too tough for a rugged Schramm Air Compressor. Construction and maintenance industries throughout the world today, rely on Schramm built units.

Precision manufacturing, quality materials and modern design are combined to give you a dependable trouble free unit. Unfaltering air delivery is certain even under the most adverse conditions of climate or locality.

Our engineering staff is at your service—ask them for recommendations concerning your air problems.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Air

WHERE, WHEN AND AS MUCH AS YOU NEED.

New Concrete Paving For Beeline Highway

(Continued from preceding page)

the job one morning, preoccupied with all the problems of early preparation. An old farmer near-by who owned an irrigation well approached him.

"I got a good well here, Mister," he offered. "Reckon you can use it?"

Hill's mind clicked. "I'll say I can!" he smiled. "How far down do you have to go for water around these parts?"

"Aw, not far. Maybe 3 or 4 feet."

"Maybe I could dig some wells with a dragline in those low spots?" Hill suggested, gesturing up the road.

"Hey, I never thought of that!" exclaimed the farmer. "You construction fellers get some darn good ideas, but then you got the machinery to back 'em up with."

And so a source of mixing water was born. Hill's dragline dug two holes. A Jaeger and a Gorman-Rupp pump, both 4-inch centrifugal machines, were set up. A 3-inch steel pipe header was laid through the job, except in the town of Valley, where city water was available. Valves were spaced about 300 feet apart, and pump pressure on the line kept the paver supplied. The dragline-excavated holes, which were only 10 feet deep, supplied plenty of water.

Subgrade and Pour Preparation

Before the new 22-foot concrete ribbon could be laid, with its 1 13/16-inch crown tapering off beautifully to grassy shoulders 8 feet wide, there were still some preparatory operations. These included making ready the subgrade; setting steel forms; sweating with sledgehammers over steel pins; and cutting the last fraction of an inch of pungent earth away from the silty subgrade floor.

They included the off-rhythm movement of a labor gang setting forms far out in front, and the "tut-tut-tut" of a Jaeger form tamper hammering dirt under form flanges with its junior-miss-size steel feet: a drama of motion and sound drowned out occasionally by the thunder of big oil-burner locomotives on the Union Pacific tracks.

The subgrade was so well shaped when the contractor finished the embankment that the trench for steel-form bases was cut in with a Caterpillar No. 12 motor grader. A labor gang of twelve men set the Blaw-Knox steel forms, lined them up, and drove three heavy steel pins down through the pin wells of each 10-foot section. With 4,000 feet of forms on the job, the labor gang kept ahead of the paver easily enough by about 800 feet.

In any case, regardless of what footage was placed, the forms were all moved and set ahead the day after a pour. Two men in the 12-man force trimmed and checked the subgrade, using hand tools. Survey stakes 50 feet apart were only 24 inches offset from the edge of concrete. Steel pins with a stout string pulled taut were used to guide the forms to perfect alignment. A rule and carpenter's level were used at survey points to establish the grade of the string.

When the forms were set, a Jaeger form tamper tamped dirt underneath the flanges. A Buckeye R-B Form-grader then passed over the subgrade and trimmed it to its proper elevation. Excess material from the endless chain of cutting buckets was dumped on the north shoulder. The little dirt this machine left just inside the steel was shoveled out by one man, and dumped outside on the steel base to prevent concrete from sticking when the paving machines passed by.

A Caterpillar RD5 tractor with a drag planer shaped the subgrade for crown. The earth was then rolled by an Inter-



C. & E. M. Photo

Workers on the Dobson & Robinson paving contract shovel corners full of concrete at an expansion joint, with dowel steel capped and the "spider" reinforcing in place.

national wheel tractor with 18-inch concrete-ballasted wheels. Density tests were taken by the State about every

500 feet, with compaction requirements based on 90 per cent.

When the subgrade was finished, the

center-joint metal with its fabricated key was set in place and staked down with pins. Some 16 dowels 26 inches long, of 3/4-inch round steel, were put in place 4 inches above the subgrade floor at the contraction joints. Eight of these dowels were mounted on a section of three pieces of longitudinal steel, and two sections were used to each joint. The forward end of the dowel steel was greased. Two 11-foot strips of 3/8 x 2 1/2-inch asphalt mastic were used in this joint.

Expansion joints were set in place on elaborate steel cages every 120 feet, with reinforcing-steel "spiders" at the corners. Expansion-joint dowels were 28 inches in length. Grease and tin cupping devices 5 inches long over the forward end were designed to make slab movement easy.

Concrete slabs are not rigid. They twist and curl and the sections expand in summer and contract in winter. When a slab or its supporting subgrade is not strong enough to take these

(Continued on next page)



USES

PRIMACORD is used as a detonating fuse for TNT, demolition blocks or other explosives and is more dependable than electrical fuses for insuring the simultaneous detonations of a number of charges assembled on a single line.

Fire Fighting—Trees can be felled merely by wrapping a few loops around each tree and detonating.

Digging Post Holes—Primacord can enlarge a small hole rapidly and cleanly, and consequently is most useful in telephone and telegraph line construction.

Control of Pine Bark Beetle—One loop of Primacord around a tree, upon detonation, will strip the bark from the tree.

Drainage Operations—Primacord is more effective than dynamite for running ditches through hard, dry ground.

Substitute for Blasting Caps—Primacord has already obtained widespread favor as a substitute for blasting caps because of its ease of handling, its relative insensitivity, and its efficiency.

Offers to purchase all or any part of the above material, f.o.b. location, will be accepted until noon June 25, 1947, by the Regional Office having the inventory. WAA reserves the right to reject any or all offers, to make awards in whole or in part, or to extend the period of the sale. Material is subject to withdrawal prior to contract of sale.

This is a concurrent and continuous sale. 5% of the total inventory will be reserved to fill orders received from Federal Agencies by noon on June 25, 1947. All other orders received by noon on this date will be filled in the following sequence: (a) Certified veterans of World War II, (b) Subsequent priority claimants, (c) Non-priority purchasers.

All orders received after this date will be filled without regard to priorities. Purchaser's order must state thereon: (a) "This order is subject to War Assets Administration Standard Conditions of Sale, and all other advertised terms and conditions, and no other terms or conditions should be binding on War Assets Administration"; (b) Type of business and level of trade. Orders from veterans must show certification date, case number and location of certifying office.

PRIMACORD

APPROXIMATELY 23,000,000 FEET

PRICE \$.015 PER FOOT, F. O. B. LOCATION

(Sale closes June 25, 1947)

PRIMACORD is a commercial detonating fuse used for firing high explosive blasting charges. It consists of an explosive core of PETN contained within a flexible, waterproofed fabric covering. It is about 1/4" in diameter, weighs approximately 15 pounds per 1,000 feet, and has a tensile strength of 113 pounds. PRIMACORD is an extremely effective detonating agent due to the fact that PETN is a forceful explosive with a velocity of 20,350 feet per second.

PRIMACORD is a relatively safe detonant, is easy to handle, comparatively insensitive to shock, friction, or flame, and both the covering and the explosive core are water resistant. It can be fired by either an electric or non-electric blasting cap.

PACKAGED—On wooden spools in lengths of 50 feet, 100 feet and 1,000 feet.

Minimum Quantity—5,000 feet

Price—1 1/2¢ per foot, f. o. b. location, on any size spool.

This material is available for sale at the following War Assets Administration Regional Offices in these approximate quantities. Offers to purchase may be made by letter, wire or personal visit to any of the Regional Offices listed. If your offer is written, mark your envelope, "Offer to Purchase Primacord, A-113,2058".

WAA also has available TNT, electric and non-electric blasting caps.

WAA OFFICES	FEET	50' SPOOLS	100' SPOOLS	1000' SPOOLS
Chicago	522,100	5,608	2,407	1
Cincinnati	3,871,350	6,848	35,289 1/2	—
Grand Prairie	113,250	613	586	24
Denver	3,031,300	8,000	26,313	—
Los Angeles	2,552,500	19,914	15,158	41
Nashville	2,160,100	18,658	12,262	1
Omaha	148,700	—	—	—
Philadelphia	503,300	10,066	—	—
Salt Lake City	9,163,500	42,270	70,000	—
San Francisco	632,100	88	6,277	—
	22,698,200			

Purchasers of Primacord are required to observe all applicable laws regulating the sale, use, handling and storage of explosive materials.

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WAR ASSETS ADMINISTRATION

Offices located at: Atlanta • Birmingham • Boston • Charlotte
Chicago • Cincinnati • Cleveland • Denver • Detroit • Grand Prairie, Tex.
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St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa 1148

New Concrete Paving For Beeline Highway

(Continued from preceding page)

stresses, the slab cracks. Engineers, like doctors, make minor miscalculations. If you do not believe this, drive your automobile some Sunday afternoon over the nearest pavement to the nearest cemetery.

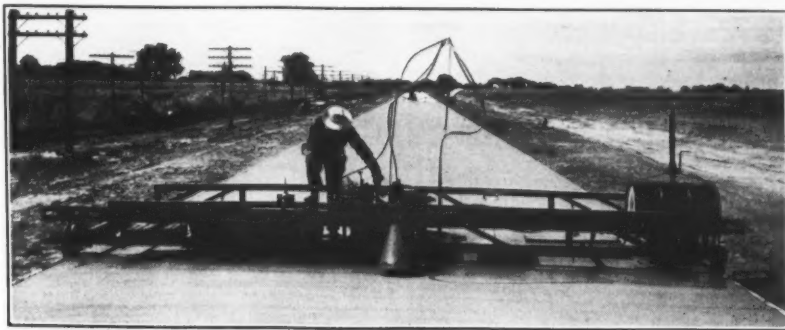
Mixing and Placing

The narrow south shoulder was the only means of access for trucks. Ira Hill used it for the incoming batches, and installed a Blaw-Knox turntable about 250 feet ahead of the paver. From 200 to 240 trucks rolled up each 10-hour day on this table, and were reversed in direction by L. L. Stecher, a 51-year-old construction stiff who drove the first lead team of mules on an elevating grader in Nebraska 32 years ago.

According to Stecher, one of the important tricks in operating a turntable is to keep its base level. Get it the least bit tilted, and what the white-collar boys call "employee fatigue" will mighty well make your rear end drag before the sun goes down.

The batch trucks dumped directly to the hopper of a single-drum MultiFoote 34-E paver, with dual-gate bucket on a 30-foot boom. A spotter was stationed at the mixer to help truck drivers back in, and to keep some 400 feet of 2½-inch water hose in the clear. Batches were mixed 60 seconds.

They were spotted on the subgrade by the paver operator, who picked about four average locations across the slab



C. & E. M. Photo

This Flex-Plane automatic spraying machine atomizes Hunt Process Clear concrete-curing solution through its nozzle on the 10.7-mile Nebraska paving job. A wind skirt helps direct the solution down onto the pavement.

for dumping his concrete. A 5½-inch layer of plain concrete was first laid down and spread by a Jaeger concrete spreader. Then four men carried a mat of reinforcing mesh and placed it on the wet concrete. The edges were tamped down to the proper level by hand shovels. After that the paver and spreader moved back and laid 2½ inches more concrete on top of the steel mat.

The Jaeger spreader was followed by a Blaw-Knox double-screed finisher. Two Viber electric vibrators at each forward corner of this machine consolidated the concrete along the edges of the steel forms. Also on the forward corners was a built-in guard which trapped surplus grout and rolled it on ahead where it could be used. A portable bridge was then brought up and two men set the ¾ x 2½-inch mastic strips 11 feet long in the transverse slot. The mastic pieces were set in a metal cap made by Allen Machine Shop of Ames, Iowa. It could stand the necessary hammering to get the mastic down ½ inch below the slab surface where

it belonged. On the back of this machine was a steel knife which pressed down in the wet concrete and cut the transverse joints every 40 feet. The best day's run was 128 feet an hour for a 10-hour shift.

A Koehring Longitudinal Finisher followed the joint setters. A very little surplus grout from this finisher spilled

out of the forms and over the sides, but it fell on the dirt our man had shoveled there during fine-grading. Hand finishers with long-handled floats and straight-edges followed the Longitudinal Finisher to remove any irregularities in the surface.

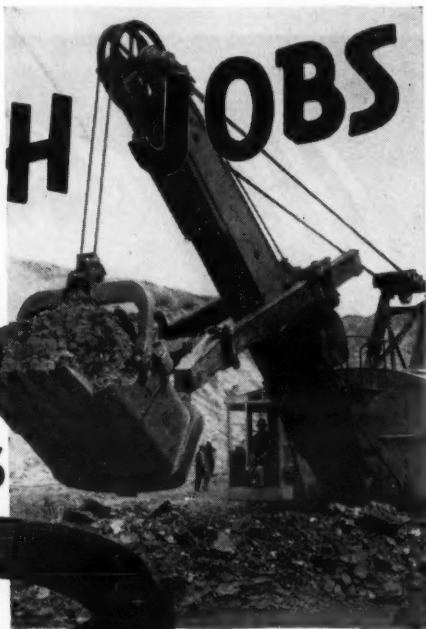
The final finishing was performed by two men who belted the surface, removed the joint caps, and edged the joints and edges of the pavement.

The finished concrete was cured by Hunt Process Clear membrane-sealing solution. This was applied by one of the new Flex-Plane automatic spraying machines, the only one at this writing in the state of Nebraska. The new machine is self-propelled, and it atomized the Hunt Process through a nozzle head powered by a DeVilbiss compressor and a Novo gasoline engine.

State Resident Engineer S. R. Gilbert made some routine studies of the new machine, very carefully checking its results against the curing specifications. He found that the machine traveled 900

(Concluded on next page)

For TOUGH JOBS GATKE SWING FRICTIONS



GATKE Moulded Asbestos
Swing Friction. Made in
all shapes and sizes.

GATKE Brake Linings, Clutch Facings and Frictions

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Road Building and
Contractors' Equipment.

Replacements for
popular models
carried in stock.

TREMENDOUS POWER—for effortless control—no let down when things get hot.
SMOOTH ACTION—for precision handling—no grabbing or chattering.
LONG WEAR LIFE beyond comparison.

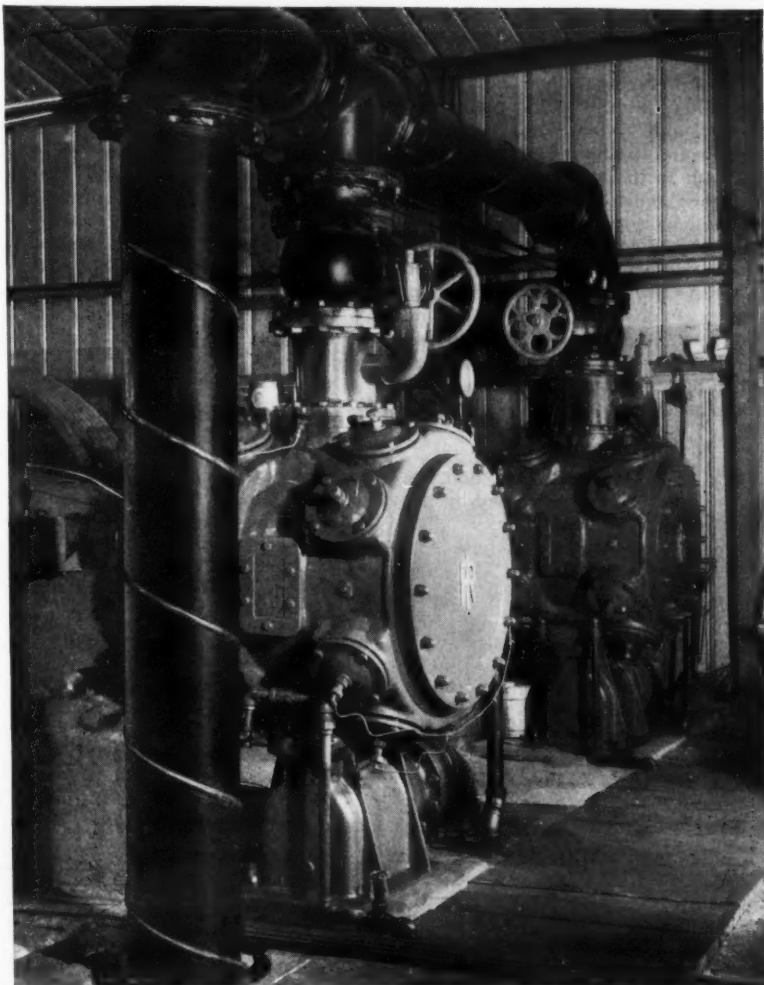
These are a few of many extra performance values that help keep production high and maintenance low.

Whatever the equipment or service, send details and dimensions for the GATKE Recommendation.

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232 N. La Salle St., Chicago 1, Ill.

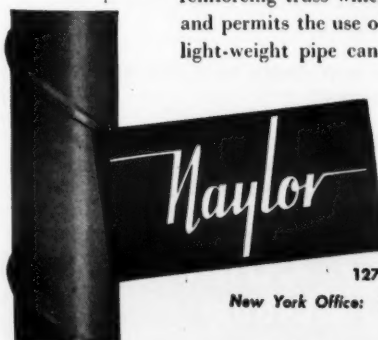


NAYLOR PIPE provides

AIR TRANSPORT for Contractors

Where there is air to be moved, today's ideal vehicle is Naylor light-weight pipe. More and more contractors are using this distinctive pipe for push-pull ventilating service and high or low pressure air lines. The exclusive Lockseam Spiralweld makes Naylor Pipe tight, leak-free, stronger and safer. This structure creates a reinforcing truss which provides additional collapse strength and permits the use of Naylor Pipe on air jobs that no other light-weight pipe can handle. The larger diameter pipe required, the more this is true.

It will pay you to get the complete story. Write for Catalog No. 44 today.



NAYLOR PIPE COMPANY

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New York Office: 350 Madison Avenue • New York 17, N. Y.

New Concrete Paving For Beeline Highway

(Continued from preceding page)

feet on one 55-gallon drum of curing membrane, where all previous hand-applied solution had given an average of only 650 feet. He then checked over the surface of 5 miles already poured and could not find a single hair check in the pavement, even though the weather had been hot. The machine has a hood guard below the atomizing nozzle to help direct the solution down on windy days.

A laborer with a shovel cleaned all the concrete and dirt off the outside form base and sides after the edgers had passed by. Form pins were pulled 24 hours later and the forms were moved ahead by a flat-rack truck.

Shoulder Construction

Work began on the construction of 8-foot earth shoulders as soon as the paving job had advanced about 5 miles. A Caterpillar D8 tractor with a Le-Tourneau 8-yard Carryall was brought in to haul dirt from the parallel borrow areas. This material was spread in 4-inch lifts and rolled with the International roller-tractor. Compaction was carried up to the pavement level, and the surface sloped very slightly away from the concrete.

In another year, perhaps, that shoulder and the backslopes will be green with grass and low-growing vegetation. The scars of construction will be a thing of the past, and motorists racing big Union Pacific passenger trains between Omaha and Fremont may exclaim, "Nebraska certainly builds good roads!"

Personnel

Paving started July 9, 1946, and the job was scheduled to be finished by the first of October.

On-the-job supervisors included, in addition to Hill and Gilbert, Concrete Foreman Carl Walls and Batch Plant Foreman Fred Wenske. The job was done under the general direction of Engineer of Construction A. W. Bohner, who visited the job several times. F. H. Klietsch is Chief Highway Engineer for the Bureau of Highways of Nebraska, with Wardner G. Scott in charge of the Department of Roads and Irrigation as State Engineer.



An experimental rear-dump Euclid of 40-ton capacity, powered by a Cummins 550-hp diesel, takes a field test.

New 40-Ton Rear-Dump Truck Is Tested on Job

A rear-dump truck with a capacity of 40 tons, believed to be the largest ever built, is now being put through field tests by its manufacturer, The Euclid Road Machinery Co., Chardon Road, Cleveland 17, Ohio. Still in the experimental stage, it is powered by a 12-cylinder supercharged Cummins diesel engine of 550 hp. Gross weight of the truck with capacity payload is approximately 80 tons. The unit is designed for heavy-duty earth and rock work.

The two front tires are 18:00 x 24, and the other eight are 16:00 x 32, all made by the Goodyear Tire & Rubber Co. Future production plans for the model will be developed after the tests, says Euclid.

Heavy-Duty Tractor Winch

A heavy-duty winch for use with International tractors is described in a folder distributed by the Lufkin Foundry & Machine Co., Lufkin, Texas. Model 125 is designed for use with the TD-18 and TD-24 TracTractors, and Model 60 for use with the TD-14.

Model 125 is rated at 125,000-pound line pull; Model 60, a 60,000-pound line pull. The former will hold 681 feet of $\frac{7}{8}$ -inch cable, 534 feet of 1-inch, and 403 feet of $1\frac{1}{8}$ -inch. Line speeds, with a full drum, range from 57 to 132 fpm forward and 62 to 143 fpm in reverse. Weight of the winch in pounds is 4,085, and it has a positive drum clutch.

Safety Tire Tubes Seal After Puncture

Production of Seal-O-Matic puncture-sealing safety tubes has been resumed by The B. F. Goodrich Co., Akron, Ohio. These tubes contain a gum-like rubber compound under the tread and shoulder areas of the tire which is said to surround and grip puncturing objects so that no air escapes. When the puncturing object is removed, the gummy sealing substance is said to flow into the remaining hole and seal it, obviating tube repair.

In addition to the compound, Seal-O-Matics are built with unusually thick walls to give the tire body extra support to resist sudden shocks and sharp blows. The company explains that the tube, due to its added wall thickness, can resist for a longer time the roughness or pinching action of a tire cut or break.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 31.

Tailor-Made Lubrication Guide for Specific Job

A lubrication-guide service has been made available to contractors by the Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa. The service provides tailor-made information for each specific job, and is available at no charge.

Under this plan, a company engineer visits the job to study its requirements. Then a series of four composite lubrication charts covering various types of contractor's equipment; a set of three contractor's work cards; and a set of four charts, notebook size, are designed for the specific job.

The Gulf Corp. will be glad to arrange for this type of service on request.

The Model 60 will hold 1,109 feet of $\frac{5}{8}$ -inch cable, 769 feet of $\frac{3}{4}$ -inch, and 516 feet of $\frac{7}{8}$ -inch. Line speeds, with a full drum, range from 25 to 72 fpm forward and from 27 to 78 fpm in reverse. Its weight is approximately 3,000 pounds.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 64.

West-Coast Manager Dies

The death of William C. Champion of Seattle, Wash., has been announced by the Shovel & Crane Division, Lima Locomotive Works, Inc., Lima, Ohio. At the time of his death he held the position of District Manager of the Pacific northwest territory. Mr. Champion, who was 65, had been with the company since 1930.

Altimeters for all preliminary surveys



How much money will this instrument save YOU? Preliminary surveys in 1/10th the time with accuracy better than 1 part in 1000.

Type SA-1: Range 4360' (-760' to + 3,600') in intervals of 2'
Type SA-2: Range 10500' (-500' to + 9,700') in intervals of 5'
Type SA-3: Range 15000' (-500' to + 14,500') in intervals of 10'

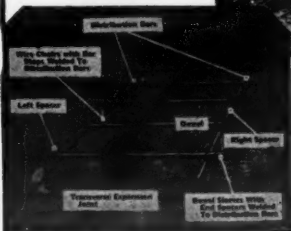
All models priced \$200 complete with case, hand & shoulder straps, magnifier and thermometer. IMMEDIATE DELIVERY—see your dealer or write direct for descriptive folder.

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Manufacturers of Precision Instruments

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Altimeters



**INSURE
TRANSVERSE JOINT
MOVEMENT—**

**USE
LOAD TRANSFER DOWELS
ALIGNED BY
LACLEDE DOWEL SPACERS**

- SHOP FABRICATED UNIT—LACLEDE WELDED DOWEL SPACERS, A SHOP-FABRICATED UNIT INSURES ACCURATE ALIGNMENT OF SHEAR DOWELS.
- WIRE CHAIR SUPPORTS—HEAVY PREFORMED WIRE CHAIRS SUPPORT EACH DOWEL TO EXACT HEIGHT.
- EASY ASSEMBLY—DISTRIBUTION BARS, SLEEVES, BAR STOPS AND SUPPORTS ALL SHOP WELDED INTO ONE UNIT FOR QUICK HANDLING AND ASSEMBLY. NO WIRE TIEING REQUIRED.

LACLEDE STEEL COMPANY
SAINT LOUIS, MISSOURI



"Wipe your feet!"

Construction Safety Discussed at Meeting

Safety during highway construction and in hoisting operations, and controls for blasting hazards, were three subjects discussed at the 17th annual convention of the Greater New York Safety Council. The meeting was held in the Hotel Pennsylvania, New York City, March 25-28.

The first speaker at the construction session was Robert W. Cleveland of Robert W. Cleveland & Co., East Orange, N. J. He discussed the various problems involved, and how they were met, during the widening of the Elizabeth-Newark express route, said to be the most heavily traveled road in the world. The major problem on this job was to keep traffic moving, and at the same time keep construction under way with a maximum amount of protection for both workers and drivers.

W. E. Rossmagel, Safety Engineer of Consolidated Edison Co. of N. Y., Inc., reviewed the requirements and precautions necessary to provide an adequate margin of safety in hoisting operations. His talk, which was illustrated with lantern slides, contained information on the right types and sizes of equipment, and how they affect safety, as well as proper safety measures once hoisting operations are under way.

The last speaker on safety in construction was S. G. Cathrall, Assistant Manager, New York District, E. I. duPont de Nemours & Co., Inc. Mr. Cathrall discussed the recent developments in furthering safety in the use of dynamite and tying in and shooting for maximum safety and efficiency. He gave a brief outline of the types of explosives and their chemical composition. He also discussed the subject of safety controls in making explosives.

New Model Band Saw

A new model band saw standing 37 inches high has been announced by the Hamer-Nixon Corp., 402 Swetland Bldg., Cleveland 15, Ohio. The width of the Model 80 Simple-Simon band saw is 22½ inches.

Feature of the saw is double ball-bearing suspension of each wheel with lifetime grease seals. It has hardened adjustable roller guides, and is provided with a guard over the blade. The saw body has heavy ribs of high-tensile aluminum.

Precision-balanced wheels are said to provide smooth operation. A heavy spring retains tension on the saw blade in order to reduce breakage to a minimum. The tabletop tilts from 0 to 45 degrees. Main components of the saw are constructed of dural and aluminum. Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 61.

Mack Appoints Rowold

The appointment of Henry Rowold to the position of Assistant General Sales Manager has been announced by Mack International Motor Truck Corp. of New York City. Mr. Rowold, also a Vice President of the company, combines his new duties with those of Na-

tional Accounts Manager, a position he has held for some time.

Rock Drill Converts To Wet, Dry, Blower

A lightweight rock drill with a new three-in-one backhead which permits the machine to be converted to a wet, dry, or blower type has just been announced by the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. This new J-30 Jackhammer is in the 30-pound class, and is designed for drilling medium to hard rock.

Its other features are a new sealed throttle valve, a stronger rifle bar, a two-piece chuck, and a long-wearing piston. Large bearing faces are provided on the cylinder, piston-stem bearing, and fronthead. Fronthead alignment is maintained and an extra-rigid joint is said to result.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 88.

MORE PROFIT on your jobs if you arc weld with a HOBART

...and this big portable gas engine driven welder with remote control

Costs less than you think



Ask the boys who served in the Army Engineers or Navy Seabees. They'll give you the lowdown on DEPENDABILITY and ECONOMY to be expected when you put Hobart Arc Welders on ANY JOB.

In addition to superior welding performance, Hobart also offers the advantages of using the same unit to provide POWER for other operations on construction job.

You can also get the highest quality welding supplies and electrodes from Hobart—the headquarters for "Single Source Arc Welding Facilities."

Write for detailed information, without cost or obligation.

HOBART BROTHERS CO., Box CE-57
Troy, Ohio

"One of the World's Largest Builders of ARC WELDERS" H

When you buy paving equipment today, make sure it will equip you to meet the problems that are coming—entirely different specifications, new designs of pave-

JAEGER EQUIPS YOU for modern paving work

ments and paving materials presenting problems of remixing, of internal deep vibration, of laying new contours, of finishing new types of concrete—and always the problem of keeping your job costs below your estimates. Your Jaeger distributor knows the most modern paving machinery and its possibilities. Talk it over with him. You'll be ahead.

Julius Porath & Sons Co., Detroit, laying super-elevated curve of 35° maximum slope with ingenious strike-off mounted on Jaeger Finisher.



Jaeger Screw Spreader remixing as it places stiff material.

Jaeger High Speed Finisher sets fast pace for two big pavers.



THE JAEGER MACHINE COMPANY, Columbus 16, Ohio
REGIONAL OFFICES: 8 E. 48th St. NEW YORK 17, N. Y. 226 N. La Salle St. CHICAGO 1, ILL. 235-38 Martin Bldg. BIRMINGHAM 1, ALA.



"AIR PLUS" Compressors



"SPEEDLINE" Concrete Mixers



"SURE PRIME" Contractor's Pumps

JAEGER
Engineered EQUIPMENT
"DUAL-MIX" TRUCK MIXERS, AGITATORS — HOISTING
ENGINES, SELF-RAISING TOWERS — CONCRETE AND
BITUMINOUS PAVING EQUIPMENT



Three Caterpillar D8 tractors and scrapers make a cut and fill on a section of the Pan American Highway in Guatemala. This work, which was started in August, 1945, is carried on by the Guatemalan Department of Public Roads.

U. S.-Built Machines On Pan American Route

Construction of the Guatemala section of the Pan American Highway is being pushed in both directions from Guatemala City. Known as the Franklin Delano Roosevelt Road in Guatemala, the new highway will stretch more than 500 kilometers to link Mexico and the southern republics of Central America through Guatemala's middle highlands.

A fleet of American-built construction equipment, including twenty-five Caterpillar crawler tractors, has started the job of moving thousands of tons of earth, sometimes carving the way out of sheer hillsides.

Work on the Roosevelt Road was started by the Department of Public Roads of Guatemala in August, 1945. Officials of the Department estimate that the entire project will be completed within six years, although it is hoped that a passable through road can be finished sooner. Cost of the entire Guatemalan project is said to be \$9,000,000.

Asphalt surfacing is being used throughout, with a paved width of about 23 feet. Broad shoulders will generally give the road an overall width of 42 feet, although the shoulder width is being narrowed slightly in the worst of the mountainous country.

At the Mexican border the road will cross the frontier about 100 kilometers from the Pacific coast, in the heart of the Sierra Madre Mountains. At the highest point, it will rise some 10,000 feet above sea level. The hot low country is being avoided, and at no point will the new road be lower than 1,200 or 1,300 feet above sea level.

After passing the high point, near Quezaltenango, the road will descend gradually towards the frontier of El Salvador.

Catalog on Instruments For Engineers, Builders

Some 217 pages of information on all types of surveying, building, and engineering instruments and accessories are contained in the 8th catalog edition of the David White Co., 305 W. Court St., Milwaukee 12, Wis. Also included in the catalog are items of office and field equipment available through the David White Co., such as drafting papers, slide rules, tables, drawing instruments, scientific books, etc. The catalog is book-bound and illustrated with photographs and drawings.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 68.

Davey Adds Sales Outlets

Ten new dealers have been appointed by the Davey Compressor Co., Kent, Ohio. The Midwestern Engine & Equipment Co., Inc., 105 No. Boulder, Tulsa, Okla., has been named distributor for the state of Oklahoma. The Berry Brothers Machinery & Repair Works, 378 So. Industrial Blvd., Dallas, Texas, will distribute Davey equipment in northeastern Texas. And Knox-Tenn

Equipment Co., Knoxville, Tenn., will cover the eastern part of Tennessee.

Five of the new dealers will handle the complete Davey line including trailer compressors of 60 to 315-cfm capacities, Auto-Air, Track-Air, Air Chief, and industrial departmental com-

pressors; heavy-duty power take-offs; and Da-V-Lite portable lighting units. The full-line dealers are: Barton-Stephens & Co., 822 S. W. 9th St., Des Moines, Iowa; Equipment Rental & Sales Corp., 1211 So. 5th St., Minneapolis, Minn.; Highway Equipment & Supply Co., 21st and N Sts., Lincoln, Nebr.; Industrial Equipment Co., 10911 Russett St., Oakland, Calif.; and Mertes Machinery Co., 1622 So. 1st St., Milwaukee, Wis.

In addition, industrial-compressor distributorships have been awarded to: R. V. Seaman Co., 822 Janes Ave., Saginaw, Mich. and Seaman-Detroit Corp., 7361 Fenkell Ave., Detroit, Mich.

Joshua S. Sawyer Dies

The death of Joshua S. Sawyer after three-months' hospitalization has been announced by The Asphalt Institute. At the time of his death, Mr. Sawyer was Manager of the Asphalt Department of the Shell Oil Co., and a Director and Vice President of The Asphalt Institute. His engineering asso-

ciations included the American Society of Civil Engineers and American Society of Military Engineers.

Got an Old Truck Around? Win a Brand New One Free!

A nationwide search to find the oldest Chevrolet truck still in active service in the United States has been announced by the Chevrolet Motor Division, General Motors Corp., Detroit, Mich. Owner of the oldest vehicle will be presented with a new truck from the Advance-Design line of trucks which will be introduced by Chevrolet in the near future.

Rules of the contest provide that the truck must carry 1947 license plates and be driven to a Chevrolet dealership for official registration. Age of each truck will be determined by the serial number of the vehicle. The contest will close on June 15. Owners are urged to enter their oldest truck as it may be the winner.



A Timely Tip

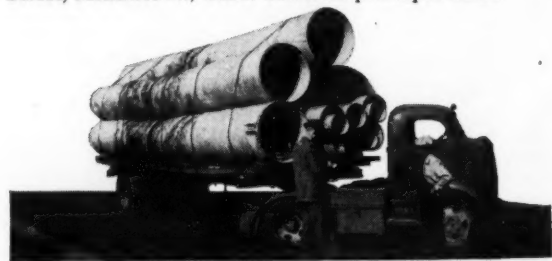
THAT SAVES CONTRACTING DOLLARS

Experienced contractors have long known ARMCO Corrugated Metal Pipe as a positive aid to bigger job profits. Today the time- and labor-saving features of this durable pipe are more important than ever, and this is why . . .

Savings start the minute you begin to transport ARMCO Pipe to the job site. Although amply strong it is light in weight for easy handling, loading and hauling. Fewer trips and less labor are needed. Long lengths are securely joined by simple band couplers. On the job a small, unskilled crew installs it quickly without cradling, and backfilling can be done immediately. No curing and no delays to other operations. The entire job is speeded up.

Let ARMCO Corrugated Pipe help you keep under the budget on that next contract. Use it for culverts, conduits, sewers, and wherever else drainage is needed. There is a

type for every condition. Write for complete information. Armco Drainage & Metal Products, Inc., 2055 Curtis Street, Middletown, Ohio. Offices in principal cities.

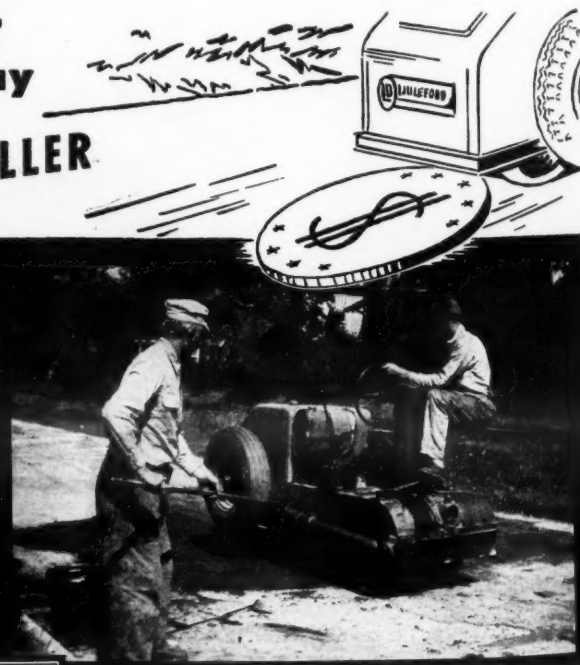


ARMCO CORRUGATED PIPE

Make Your Repair Dollar Cover More Roadway

with LITTLEFORD
TRAIL-O-ROLLER

This Littleford No. 155 Trail-O-Roller covers ground like a kid in a baby walker! It makes your dollar do a bigger job because whatever it rolls is there to stay. Gets to more jobs because it trails safely at any speed. Patented Hydraulic lift converts it easily from rolling to trailing position. Powered by air-cooled engine; has automotive type steering control, heavy duty transmission, machine finished cast main roller. Use Trail-O-Roller for all patch work, shoulder widening, alley paving, airport runways, driveways, parking areas, school yards...everything! Write for Bulletin No. 3 today.

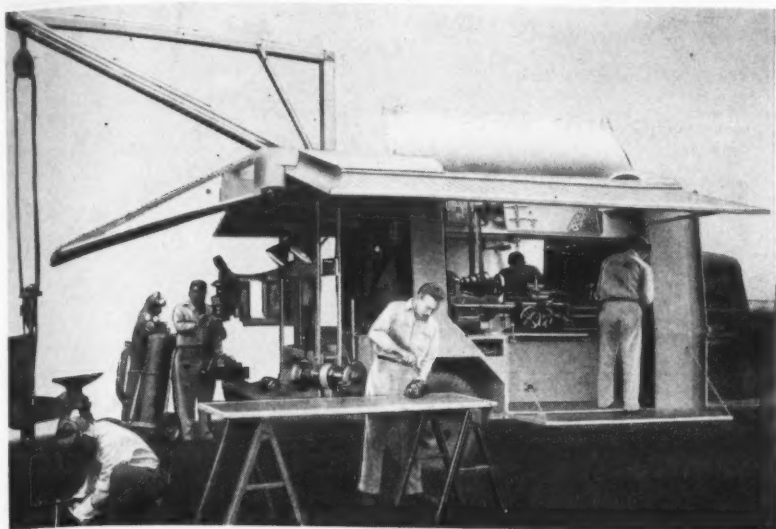


LITTLEFORD

LITTLEFORD BROS., Inc.

485 E. PEARL ST.,

CINCINNATI 2, OHIO



This shop on wheels brings a variety of repair facilities to the job.

Shop on Wheels Has Complete Facilities

The Model M shop on wheels made by Couse Mfg., Inc., 300 Passaic St., Newark 4, N. J., is said to bring complete heavy-duty shop repair facilities to the job. It is laid out so that the inside of the unit can be used for precision and light assembly work, and the outside for heavy work.

The equipment includes a forge, an anvil, an oxyacetylene carrier, a dynamotor-welder, a radial-arm drill press with 1 1/4-inch capacity, a 1-hp electric grinder, a 50-ton hydraulic jack, a swinging crane with a 1-ton hoist, a lathe with a 14 1/2 or 16-inch x 6-foot bed, and a Schramm-Wisconsin 50-cfm air compressor.

Power is derived from the truck transmission by means of a Couse POM power take-off. The dynamotor-welder can also be used to provide electrical power when current is available. The M is mounted on a standard truck chassis of 1 1/2 to 3-ton nominal rating.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 17.

Heil Staff Appointments

The appointment of Leonard C. Andersen as Manager of District 8, which covers California, Arizona, and Nevada, with headquarters at Los Angeles, has been announced by The Heil Co., of

Milwaukee. He will be succeeded in his former position as Sales Coordinator of the company's six divisions by Karl Mindemann, who will have his headquarters in Milwaukee.

Herman Wagen has been appointed District Sales Manager for the states of Wisconsin, Michigan, Illinois, Indiana, Ohio, and Kentucky, with headquarters at Milwaukee. Also announced at this time is the transfer of Tom Boyle from the District Office at Kansas City to the Milwaukee District Office.

Robert L. Miller, formerly Assistant Sales Manager of the Road Machinery Division, has been appointed District Sales Manager for the central states of Iowa, Missouri, Nebraska, Kansas, and Colorado. His headquarters will be in the Heil district office at Kansas City, Mo.

Rubber-Coated Gloves

Production has started on a rubber-coated canvas work glove which is said to offer protection to the hands and to have superior wearing qualities. It is made by dipping the canvas in liquid rubber up to the wrist, and then vulcanizing.

The product was developed by the United States Rubber Co., 1230 Avenue of the Americas, N. Y. 20, N. Y., in its Providence, R. I., plant.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 24.

Light Trucks Used For Heavy Hauling

A chain-drive conversion unit which enables light-duty trucks to be used for hauling heavy loads has been developed by Cook Bros. Equipment Co., 1815 No. Broadway, Los Angeles 31, Calif. The 2-axled 8-wheeled unit is made in 8, 10, 12, 16, and 20-ton sizes.

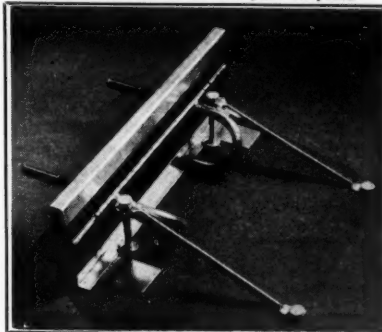
Each model chain drive is designed for a special hauling requirement, and to match the size and power of the truck used. The company says that installations have been made on trucks with engine displacement varying from under 300 cubic inches to over 800 cubic inches. Extra traction, increased power for climbing steep grades with heavy loads, equal load distribution, easy turning in close quarters, and smooth riding are some features the company claims for these units.

Eight 10-hole Budd wheels are used on all models. Tires range in size from 8.25 x 20 to 11.00 x 22. The two axles are of the square type and have capacities of 13,000, 15,000, and 20,000 pounds for the respective models. Drop-center front axles can be furnished. Axle centers are 48 inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 62.

Well Anchored Joints For Concrete Paving

Tested and Proved for the past 10 years



DOW-WELD

Assembled Expansion Joints

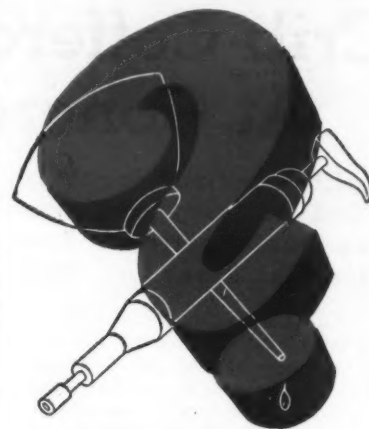
The DOW-WELD joint is delivered in the form of a rigid welded truss unit and is permanently anchored to the subgrade, thus insuring a true alignment of the dowels. Due to the staking device it is not necessary to disturb the concrete.

This joint has been extensively used for the past ten years on major highway and airport projects, and the results have been tested and proven to be satisfactory.

We shall be glad to furnish the location of such projects upon request.

DOW-WELD CO., Inc.

21st St. West of Howard, Baltimore 11, Md.



GREASE OR OIL

The question of selection of the proper type and consistency of lubricants need offer no problem. LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest grease types. All reduce friction and wear, protect against rust and corrosion, and are more economical than conventional lubricants. Let us prove our case.

R FOR YOUR MACHINERY

No. 2 — Ideal for general oil type lubrication, ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8 — Because of high film strength and long life it reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107 — One of the most popular grease type products for general application by pressure gun or cups.

No. 70 — For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA — Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

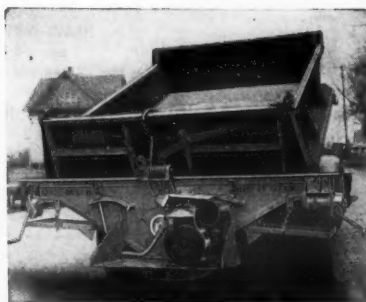
BALL BEARING — This is the LUBRIPLATE Lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.



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Greater clearance with this "Tiltlev" blade—positive, hydraulic control—fits any standard truck. Write for folder "Tiltlev—CE-5."



Even, economical distribution of resurfacing material. Unit is self-contained, self-powered. Suspend it from back of any standard truck body. Useful the year 'round! Send for folder, "Chip-it-over, CE-5."

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MARK well this button. It is worn by the men and women honorably discharged from the armed services. Though they are now in civilian clothes, let's not forget their service to our country and to us. They still rate our every consideration.

Crib Cofferdam Built At Concrete-Dam Site

Tight Construction With Wood Sheeting and Sand Bags on Upstream Face Diverts River at Mill

† A FILLED-IN timber-crib cofferdam was completed last summer across the Androscoggin River at Brunswick, Maine. Its purpose was to divert water from the site of a new concrete dam which was subsequently constructed to replace an old wooden structure. Both the cofferdam and concrete dam were built by Ephraim E. Sanders, Inc., Portland, Maine, contractor, for the Verney Corp., a textile-mill operator. This company gets power from the stored water to operate its 1,800 looms that hum in the red-brick mill on the banks of the historic river.

At this point near the Atlantic coast the river is wide and turbulent. It is dammed both naturally by rock formation, and by man-made structures of timber and concrete. Across the north half of the river a 150-foot concrete dam extends out from an old mill and powerhouse to a rocky island. From here a 110-foot wood dam stretches to another rock formation midway in the Androscoggin.

At the downstream end of this island an old timber-crib dam, with some natural help from the rocks, reached 260 feet across the rest of the river to tie in to a concrete wall on the south bank where a gate house and the Verney mill are located. It is this latter dam, out of line but still intact despite the poundings of the great 1936 flood, that was replaced with the new concrete structure.

Crib Cofferdam

Work on the temporary crib cofferdam started in November, 1945. Partially suspended during the winter and spring when the river was high, it was completed by mid-summer of 1946. The cofferdam was built in three sections. The first started from the gates on the south side of the river and extended on a line almost upstream for 125 feet. This section was strengthened by a 20-foot-square buttress crib erected on the

downstream side about 50 feet out from shore. From the far end of this portion of the cofferdam, a second section was built extending directly across the stream for 100 feet. This much of the cribbing was finished by spring.

At this location an angle pointing downstream was designed into the line of the structure, and the remaining 190 feet of cofferdam tying into the rocky island in mid-river was completed by summer. The distance between the original dam and the temporary cofferdam averaged 75 feet; this afforded ample space for the construction of the new concrete dam which was built slightly upstream from the old structure.

Before work started on the timber cribbing, soundings were taken over the site. They disclosed that the depth of the river varied from 4 to 30 feet, and that the entire bottom was ledge rock. Thus the builders knew just how deep the cribbing had to go over every foot of the bottom.

The cofferdam was constructed of 12 x 12-inch timbers, both lengthwise and crosswise, with four strung out longitudinally on 8-foot centers to set the width at 24 feet. Across these, other members were fastened on 10-foot centers with $\frac{7}{8}$ x 22-inch drift pins, making a system of 8 x 10-foot checks. A Syntro electric drill was used to bore holes for starting the drift pins.

The timbers were mostly hard pine and fir that had once served on the launching ways of a Maine shipyard. Being of various lengths, they were lashed to each other with steel cable. This made a flexible joint which served well on the uneven river bottom.

The first tier of the cribbing was floated into position and anchored. Then planks were laid across the 12 x 12's to support the workers as they added additional tiers. The upstream face of the second stringer was also planked so that the flow of the river would not wash out the fill which was later deposited within the timber framework. As succeeding layers of timber were built up, the cribbing sank gradually until it rested on the bottom. Then the structure was filled as quickly



C. & E. M. Photo

Looking upstream on the Androscoggin River, Maine, we see the old timber-crib dam in the foreground. In the background a Northwest crane works on the cofferdam for a new dam which was subsequently built between the two structures.

as possible to stabilize it in position.

Making It Tight

To make the cofferdam as impervious as possible, the upstream third was filled with fine material, while the rest of the cribbing was loaded with coarser

and heavier shale, stone, and gravel. The necessary fill was obtained from waste piles of material that had been taken from a feldspar mine of the Consolidated Feldspar Co. in Topsham, on the north side of the Androscoggin (Concluded on next page)

Steel forms BY

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Write Chain Saw Division for name of distributor. Demonstrations can be arranged.

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★ See our advertisement in The Saturday Evening Post—May 10

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PORTABLE POWER TOOLS



C. & E. M. Photo
Wooden sheet piling is driven by hand along the upstream face of the timber-crib cofferdam which Contractor Ephraim E. Sanders built for a new concrete dam.

Crib Cofferdam Built At Concrete-Dam Site

(Continued from preceding page)

across from Brunswick. As fill was required at various stages of the construction, a 1/2-yard shovel was rented when needed and sent to the mine. It loaded five trucks, each of which hauled about 4 yards 5 miles to the job site.

At the cofferdam the trucks ended-dumped their loads into 1 1/2-yard scale pans. These were then picked up by a Northwest crane with a 50-foot boom and emptied over the cribbing. Two pans were used so that one was always being filled as the other was being unloaded. As the work progressed the crane moved out over the filled-in portion. This was planked over with 2 x 12's so that the trucks could easily back out to where the fill was being placed.

A large amount of material was also dumped along the upstream face of the cofferdam into which wood sheeting was then driven to seal up the wall. The sheeting consisted of a double row of 2-inch planking, mostly 2 x 12's of random length. It was driven by a McKiernan-Terry No. 3 air hammer powered by a Chicago Pneumatic 105-cfm air compressor. Along the bottom, where the sheeting met the ledge rock, one or more tiers of sandbags were placed to make a tight joint. The cofferdam was built about a foot higher than the level of the river above the dam, which was at elevation 37.

The third and final 190-foot section of cofferdam was built to a width of 16 feet. As the river bottom is more level in this area, a series of cribs 32 feet long was used, spaced on 8-foot centers. The cross members, 8 x 8's, were spaced on the same centering which produced 8 x 8-foot checks. Reduced width was possible here since this section of cribbing did not have to meet the strong spring floods which were successfully withstood by the two earlier-built sections.

Along the top of the cofferdam a 5-foot flashboard was erected on the upstream side. On top of the outer 12 x 12's on 4-foot centers, 4 x 6 posts were set up. These were braced both horizontally and diagonally by other 4 x 6's

which were nailed to the next inside 12 x 12. Between these vertical posts 2-inch planking was fastened horizontally as the additional 5-foot barrier.

Concrete Dam


With the cofferdam tightly sealed, the river was diverted to flow over the

dams on the north half. And the construction site was soon unwatered with the additional help of a few 6-inch pumps. The working force was then increased from an average of 25 to 50 men for the construction of the concrete dam. The new structure is 300 feet long with a maximum height of 30 feet, and it required 2,350 cubic yards of concrete. Designed by Charles T. Main, Inc., of Boston, the dam was completed by November, and power is expected on the line early this year.

For Ephraim E. Sanders, Richard Staples was Engineer and for the latter part of the work was also Superintendent. The project cost between \$200,000 and \$300,000.

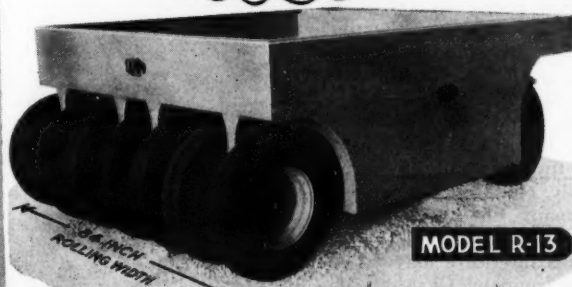
Colo. Firm Changes Name

The Equipment Repair & Mfg. Co. has changed its firm name to the Arrow Mfg. Co. Offices will remain at 194 W. Dakota Ave., Denver 9, Colo. The Arrow line of equipment includes cable-operated dozers, low-bed trailers, rippers, snow plows, and, soon, power-control units and scrapers.




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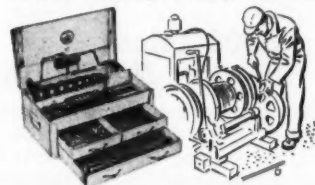
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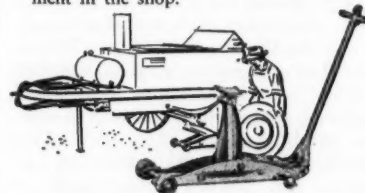
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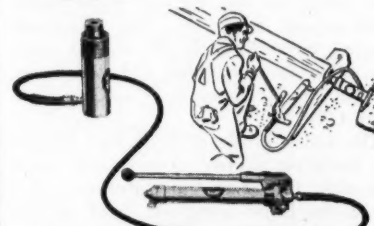


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Jacks — are indispensable in the shop or on the job. Sure, fast, 24" lift of the Blackhawk S4, with EXCLUSIVE features, makes it ideal for high axled machinery — and for jockeying equipment in the shop.



Porto-Power — EXCLUSIVE — is literally an all-purpose tool. It pushes, pulls, bends, clamps, presses and straightens — with tons of power. This safe, easily transported, remotely controlled hydraulic jack provides on-the-spot hydraulic power to lick 1001 tough jobs.



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— meet the demands of construction work with an unequalled "service proved" record of dependability, performance and freedom from maintenance. Powerful, fast acting, Blackhawk Jacks are real time savers on the job.



THE blistering pace of construction will require the best in fast working, modern tools. Unmatched versatility, speed and dependability of Blackhawk Products make them key tools for you. This multi-purpose equipment serves in every phase of construction and maintenance work. These modern, quality Blackhawk tools are built tough and rugged to stand the gaff. Their basic design is different, making them tops for speed and utility. For complete information on Blackhawk Products write us or see your Blackhawk Equipment Distributor. BLACKHAWK MFG. COMPANY, Dept. P-1857, Milwaukee 1, Wisconsin.

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on ROGERS HEAVY DUTY TRAILERS



Battered piles of the composite type, each with a bearing value of 45 tons, are clustered beneath the south wall of the new diesel-engine factory of the Caterpillar Tractor Co., Peoria, Ill. Pile-driving rigs of the Raymond Concrete Pile Co. are shown at work in the background.

Over 2,000 Piles Support New Plant

Construction work on the new diesel-engine factory of the Caterpillar Tractor Co. is progressing on schedule. It is expected that the new Peoria plant will be in operation late this year. The rectangular building will contain approximately 925,000 square feet of floor space.

The original ground on which the factory is being constructed consisted of clay loam underlaid with vegetation, varying gradations of sand and pea gravel, supported on a soapstone stratum at a depth of approximately 70 feet. Original elevations varied from 6.00 feet to 23.50 feet river datum, and finish subgrades within the building proper were established at 22.50 feet. This necessitated 8,000 cubic yards of excavation and 165,000 cubic yards of borrowed fill.

A total of 2,073 vertical piles of the step taper type and 134 battered piles of the composite type had to be driven to provide adequate support for the factory building. The piles consisted of a corrugated shell driven to proper length and filled to the cut-off point with 4,000-pound concrete. The designed bearing value of each pile was 45 tons. The piles were supplied and driven by the Raymond Concrete Pile Co., New York City.

The finish grade of 22.50 feet within the building proper necessitated considerable fill. For the difference between the finish subgrade level on the north side of the wall and the public alley which abuts it on the south side is 12 feet. This abrupt change in elevation required that the foundation act as a retaining wall designed to support both the vertical load imposed on it and the lateral stresses developed from the fill on the north side of the wall.

The constructed wall is of the battered type. It is about 1 foot 2½ inches at the top with a ½-inch batter per foot, supported on a footing 2 feet 3 inches thick x 10 feet wide. The south wall and footings required a total of 116 tons of reinforcing steel.

More than ½ mile of double railroad track, formerly owned by the Peoria & Pekin Railway Co. but now owned

jointly by the railway company and Caterpillar, had to be relocated to facilitate advantageous positioning of the new factory. About 3,200 feet of the right-of-way was raised, providing track grades compatible with the factory grades. In the relocation, seven additional turnouts were supplied. Incidental to the relocation of the tracks was the construction of 400 linear feet of timbered retaining wall in order to provide required railroad clearances between the toe of the railroad fill and the center of the tracks.

Light Grader Gas-Powered

A light grader for use in maintenance and construction is described in Bulletin MS-420-1046 issued by the Allis-Chalmers Tractor Division, Milwaukee 1, Wis. Known as the Model W-Speed Patrol, it has a 10-foot blade and is powered by a 32-hp gasoline engine.

The catalog's large photographs, accompanied by text, show the features of the engine, transmission, differential, clutch assembly, etc. Complete specifications and many on-the-job photographs complete its pages.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 83.

Connelly Firm Retires

The retirement from business of the Connelly Machinery Co., Billings, Mont., dealer in construction equipment for 43 years, has been announced by its President. The action affects both the Billings and Great Falls offices. The company has been succeeded in Billings by the Wortham Machinery Co. In Great Falls, it has been succeeded by the Central Machinery Co.

Office Opened in Brazil

The opening of a technical office in Sao Paulo, Brazil, has been announced by the Independent Pneumatic Tool Co. of Chicago, maker of the Thor line of portable pneumatic and electric tools. Reuben P. Rudy, representative in that area for the past two years, has been selected to manage the new office.

Tire Spreader Fits Most Standard Sizes

A line of air-operated tire spreaders is made by The Branick Mfg. Co., Inc., 810 Front St., Fargo, N. Dak. The Model F is adjustable to fit most standard tires from tractor sizes to passenger-car and truck sizes, the manufacturer says. It will take beads from 12 to 28 inches in diameter; it will handle 2-inch to 12.00 cross sections, and many 12.50 and 13.00 sizes. It will also handle contractors' tires up to 51-inch overall diameter. Other models, many designed for specific uses, are available.

All models spread tires by drawing beads apart horizontally. The Branick tire spreaders operate directly from regular air lines without the need for any other power. Control is achieved through the Branick three-way valve.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 18.

Compressor Bulletins

Its line of portable compressors is described in a series of bulletins issued by the Worthington Pump & Machinery Corp., Construction Equipment Division, Holyoke, Mass. These range in capacities from 60 to 500-cubic-foot models. The 60-foot model is gasoline-driven; the 500-foot model is diesel-

driven. The 105, 160, 210, and 315-foot models are driven by gasoline or diesel engines.

The bulletins feature large side-view photographs which are used to point out the individual features of construction and operation claimed for the Blue Brute line of compressors. On the back page of each announcement is a list of specifications for the compressors and the engines, as well as other pertinent data.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 82.

Tractor Steering Aid

A steering aid for use with crawler-type tractors has been announced by the Silver Booster Mfg. Co., 1406 So. Grand Ave., Los Angeles 15, Calif. At present the boosters are available for installation on International tractors Models TD-6, TD-9, TD-14, TD-18, and Allis-Chalmers Model HD-10.

The booster is said to reduce the required pull on clutch steering levers from approximately 125 pounds to less than 15 pounds. The manufacturer says that it will increase the useful operating life of clutches, clutch springs, brakes, and throwout bearings.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 67.

BIG PERFORMANCE from a Small Shovel



Use it as a dipper, trench-hoe or dragline. The Schield Bantam is a profit-maker on a multitude of jobs. It's tough enough to stand up under heavy-duty wear, yet light enough for the wettest drainage work.

The Bantam will dig a trench in varying widths and up to 10 feet deep. The ¼-yard bucket and 25-foot dragline boom make it useful on jobs where operating economy is important. The complete machine weighs less than 4 tons. It may be operated in a full circle and is mounted on 6 x 6 trucks or half-tracks.

Write today for full details on the new Schield Bantam.

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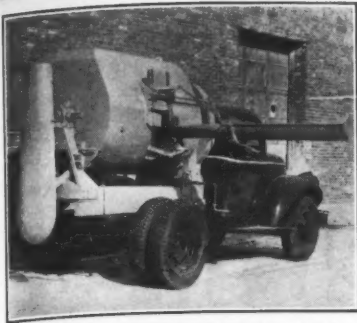
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Ease of loading, dependability and economical operation are three Martin CARRYHAUL Trailer characteristics which make them the leaders in the field. Regardless of your hauling job, there's a proper size Martin CARRYHAUL Trailer to do it for you safely and economically.

SURVEYORS' TAPES For Sale

100-ft. steel surveyors' tapes, with end graduations in tenths. Used, good condition. \$3.00 each. Send check or money order. **HARDY-LYTTON COMPANY** Huntington, W.Va. P.O. Box 411

THE AMERICAN RED CROSS
Carries On!
GIVE!



This high-discharge concrete truck-mixer has a capacity of 1.75 cubic yards and a mixing speed of 6 to 16 rpm. It is made by the Concrete Transport Mixer Co., St. Louis, Mo.

Concrete Truck-Mixer Has a High Discharge

A high-discharge concrete truck-mixer is made by the Concrete Transport Mixer Co., 650 Rosedale Ave., St. Louis, Mo. It has a drum capacity of 3.08 cubic yards, a truck-mixer rated capacity of 1.75 yards, and an agitator maximum rated capacity of 2.25 yards.

Discharge can be made from both the sides and the rear of the Model 15-H. The high-discharge feature is obtained only with side discharge, due to the arrangement of the mixing blades which raise the concrete. These blades contain abrasion-resistant rubber inserts. Mixing speed is 6 to 16 rpm; agitating speed is 2 to 6 rpm. Shipping weight is about 4,000 pounds. The unit is powered by the truck motor.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 14.

Surveying Book Revised

The sixth edition of "Higher Surveying," by Breed and Hosmer, has been published. This is Volume II of "Principles and Practice of Surveying."

Professor Charles B. Breed, Massachusetts Institute of Technology, has made certain changes in this edition which he feels will prove valuable to all users of the book. Part III on photogrammetric surveying has been extended and rearranged to include present-day methods of surveying from the air. The chapters on triangulation and astronomy have been brought up to date to conform with present practice. Many illustrations have been revised, and new problems have been introduced at the ends of the chapters.

The book is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., and lists at \$4.50.

Tractor-Equipment Line

Its complete line of tractor equipment for use with International TracTractors is described in a 20-page catalog issued by the Isaacson Iron Works, 2917 E. Marginal Way, Seattle 4, Wash.

Listed are its Trac-Dozers, both cable and hydraulic, angle-blade and straight-blade models; power units; Karry-Skrappers; Winchoists, double and single-drum models; Klearing Blades; and Super-Rooters, both cable and hydraulic. This two-color catalog contains illustrations, specification tables, and text descriptions of all the equipment.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 49.

Shock-Resistant Belting

Specifications and construction features of Monarch transmission belting are outlined by Hewitt Rubber Division of Hewitt-Robins, Inc., 240 Kensington Ave., Buffalo 5, N. Y., in a 4-page folder now being distributed by the company.

Monarch is claimed to be able to withstand the shock loads of heavy service, and is recommended by its manufacturer for use in stone-crushing

plants, quarries, and other power-transmission operations. All plies are straight-laid under uniform tension; this feature is said to give freedom from stretch and increased power delivery. The absence of folds and seams makes it possible to apply either side of the belt to the pulley.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 11.

Hand-Operated Winch Loads Trucks, Trailers

A hand-operated winch designed for loading equipment onto truck or trailer is among the products manufactured by the Meili-Blumberg Corp., New Holstein, Wis. It can be mounted on the trailer bed or on the underside, below the platform, to provide an unobstructed surface for loading machinery.

Equipped with double gear-reduction power in either single or two speeds, it is claimed by the manufacturer that gear ratios of 84 to 1 and 24 to 1 can be obtained from this winch. Drum capacity is 100 feet. The manufacturer points out that a load of 43-pound pressure applied on the handle (single speed) will pull a rolling load of 5 tons up an incline of 19 degrees.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

Eastern Gradall Dealers

Two eastern distributors for the Gradall earth-mover have been appointed by its manufacturer, The Warner & Swasey Co., Cleveland, Ohio. Distributor for the metropolitan New York area will be Edward Ehrbar, Inc., 29 Meserol Ave., Brooklyn, N. Y.

Distribution for northern New Jersey will be handled by Ehrbar Equipment Co., Irvington, N. J.

Degreasing-Solvent Plant

A new chemical manufacturing plant for the production of its Perm-A-Clor and Triad metal-degreasing solvents has been announced by the Detrex Corp. of Detroit, Mich. The plant is located on the west coast; its entire output will be non-flammable, stabilized, chlorinated hydrocarbons.

Offices and warehouses distributing these solvents are located in Los Angeles and San Francisco; Portland, Oreg.; and Seattle, Wash.

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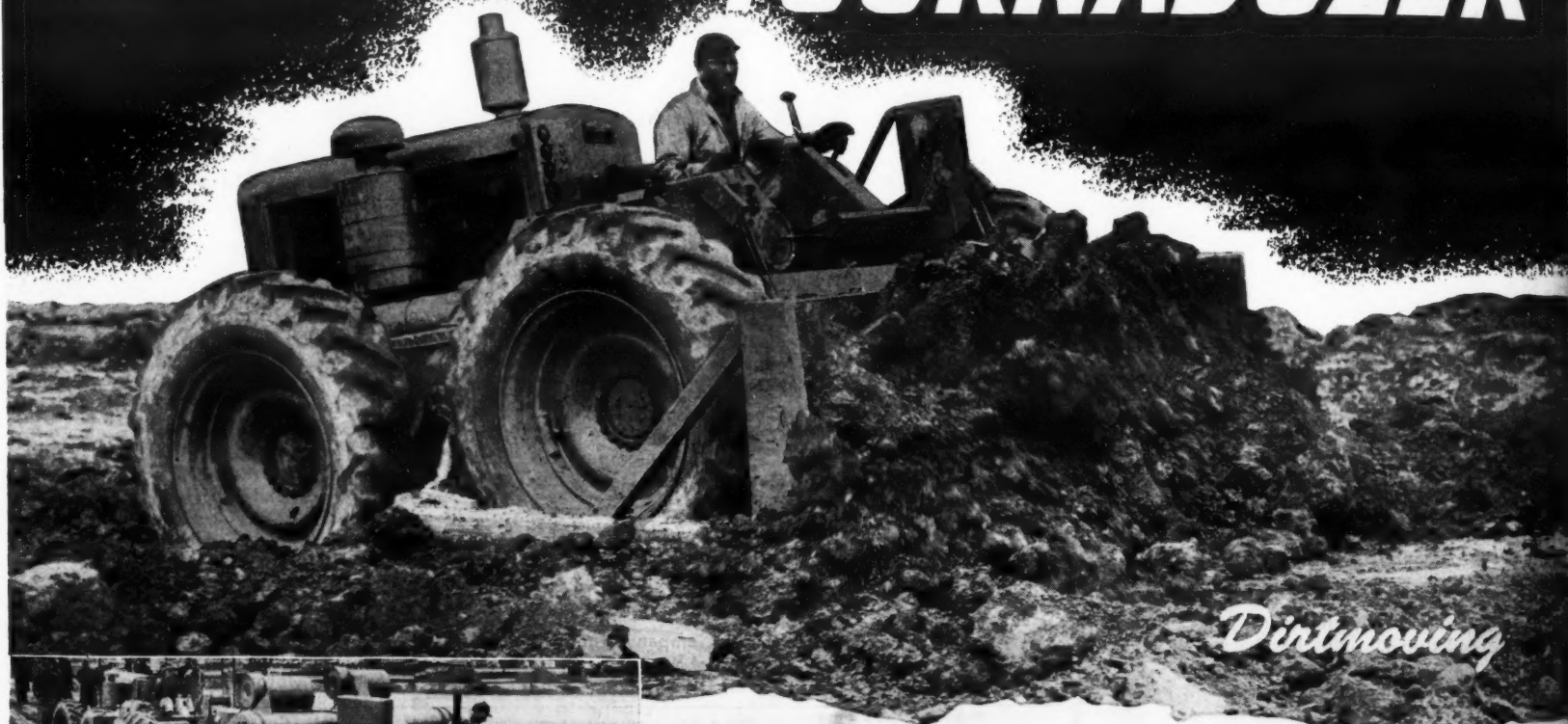
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Index to Advertisers

Agerstrand Corporation	57	LaCrosse Trailer Corporation	19
Allis-Chalmers Tractor Division	64	Lansing Company	35
All-Purpose Spreader Co.	32	LaPlant-Choate Manufacturing Co., Inc.	40
American Cable Division	10	Le Tourneau, Inc., R.G.	92
American Conveyor Company	31	Lewis Manufacturing Company	14
American Hoist & Derrick Co.	52	Lima Locomotive Works, Inc.	48
American Paulin System	84	Lion Oil Company	21
American Steel Scraper Co., The	15	Littleford Bros., Inc.	86
Ariens Company	63	Lombard-Governor Corp.	67
Armco Drainage & Metals Products, Inc.	86	Lowther Company, Harry A.	79
Athey Products Corp.	77	Lubriplate Division, Fiske Bros. Refining Co.	87
Atkins and Company, E. C.	26		
Barber-Greene Company	15	Madsen Iron Works	20
Barnes Manufacturing Co.	18	Mall Tool Company	88
Beebe Brothers	30	Martin Machine Company	90
Bethlehem Steel Company	49	Marvel Equipment Company	23
Bicknell Manufacturing Co.	9	Maxon Construction Company, Inc.	22
Bitucote Products Co.	78	McKiernan-Terry Corp.	79
Blackhawk Mfg. Company	89	Mead Machine and Iron Works, Inc.	72
Briggs & Stratton Corp.	68	Mechanics Universal Joint Division	78
Bucyrus-Erie Company	55	Michigan Power Shovel Company	66
Buda Company, The	61	Mixermobile Manufacturers	7
Burch Corporation, The	87	Monarch Road Machinery Co.	61
Butler Bin Company	56	Murphy Diesel Company	27
Caine Steel Company	60	Naylor Pipe Company	83
Canedy-Otto Mfg. Company	36		
Carlyle Rubber Company, Inc.	34	Oakite Products, Inc.	73
Caterpillar Tractor Company	8	Oliver Corporation, The	45
Chain Belt Company	16	Onan & Sons Inc., D. W.	50
Chicago Pneumatic Tool Company	75	Owen Bucket Co., The	62
C.I.T. Corporation	14		
Cleaver-Brooks Company	42	Pettibone Mulliken Corporation	53
Cleveland Trencher Company, The	58	Prima Products, Inc.	73
Coffing Hoist Company	42		
Complete Machinery & Equipment Co., Inc.	59	R. P. B. Corp.	34
Contractors Machinery Co., Inc.	54	Rockford Clutch Division	44
Continental Decalcomania Company	80	Roebbling's Sons Company, John A.	39
Continental Rubber Works	20	Roeth Vibrator Company	21
Cummer & Son Co., The F. D.	26	Rogers Brothers Corporation	89
Dallett Company, The	41	Sasgen Derrick Co.	69
Davenport Besler Corporation	33	Schild Bantam Company	90
Detroit Diesel Engine Division, General Motors Corporation	38	Schramm, Inc.	81
Dewey & Almy Chemical Company	16	Seaman Motors, Inc.	5
Diamond Chain Co., Inc.	17	Silver Booster Manufacturing Co.	76
Dixon Valve & Coupling Co.	68	Simplicity System Company, The	29
Dobbins Manufacturing Company	58	Sinclair Refining Company	19
Dodge Division of Chrysler Corp.	37	Smith Engineering Works	69
Dow-Weld Company, Inc.	87	Standard of California	43
Duplex Truck Company	31	Standard Oil Company (Indiana)	70
		Sterling Machinery Corp.	55
Electric Tamper & Equipment Co.	50	Sterling Wheelbarrow Company	80
Embury Mfg. Co.	66	Stoody Company	31
Erie Steel Construction Co.	78	Stow Manufacturing Co.	76
Etnyre & Co., E. D.	44	Stulz-Sickles Company	38
Everhot Manufacturing Co.	51	Symons Clamp & Mfg. Co.	56
		Syntron Company	76
Foot Co., Inc., The	22, 65	Templeton, Kenly & Co.	80
Ford Motor Company	11	Texas Company, The	3, 12, 13
		Thew Shovel Company, The	9
Gar Wood Industries, Inc.	36	Truk-Loder Co.	53
Gatke Corporation	83	Tuthill Spring Company	72
GMC Truck & Coach Division	63		
Grace Mfg. Co., W. E.	77	Unit Crane & Shovel Corp.	57
Griffin Wellpoint Corporation	91	United Laboratories, Inc.	65
Gulf Oil Corporation	35	United States Motors Corp.	54
		United States Rubber Company	23
Haiss Manufacturing Co., Inc., Geo.	60	Van Dorn Electric Tool Co., The	48
Hauck Mfg. Company	8	Viber Company	28
Hayward Company, The	54	Victor Equipment Company	37
Heltzel Steel Form & Iron Company	88	Vulcan Tool Manufacturing Co.	49
Hendrix Manufacturing Co., Inc.	27		
Hetherington & Berner, Inc.	67	War Assets Administration	82
Highway Equipment Co., Inc.	74	Warren-Knight Co.	64
Hobart Brothers Company	85	Waterloo Foundry Company	32
Homestead Valve Mfg. Co.	71	Waukesha Motor Company	52
Huber Mfg. Company, The	33	Wellman Engineering Company, The	74
Hurstco Incorporated	45	Western Equipment Mfg. Co.	72
		White Company, David	43
Ingram Equip. Co., J. E.	89	White Manufacturing Company	17
International Harvester Company	24, 25	Whiteman Manufacturing Company	62
Iowa Manufacturing Company	41	Wisconsin Motor Corporation	44
		Wooldridge Mfg. Company	29
Jaeger Machine Co., The	85	Worthington Mower Company	30
Jahn Company, C. R.	62	Worthington Pump & Machinery Corp., Worthington-Ransome Construction Equipment Division	51
Joy Manufacturing Company	28		
		Yaun Dragline Buckets & Mfg. Plant	18, 59
Kelly Machinery Co.	70		
Laclede Steel Company	84		

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